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ORIGINAL ARTICLES

THE EXTREME EFFECTS OF FOCAL INFECTION.

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This patient, Mr. A. D. S., married, age 60, has a negative family history. His own personal history is negative except that he has had much malarial fever in boyhod and yellow fever in 1888.

He was in good health up to February, 1922, when he gradually began to lose flesh and strength and developed marked weakness to the point of being almost unable to walk. There was no pain. He was given a diagnosis of pernicious anemia and under treatment his condition oscillated between moderate improvement and setbacks until the time when he was first seen in April, 1923. Prominent among his symptoms was a tendency to fall and he had on one or two occasions fallen at his home, and on one occasion burned his clothing by falling in the fireplace. There had been a considerable amount of gastro-intestinal disturbance but there was no headache and no knowledge of kidney trouble. He had noted swelling of the ankles for three months, which disappeared overnight. His eye-sight is poor. He has had glaucoma in both eyes and the left eye is now blind. There are cataracts in both eyes.

While sitting quietly at home on the night of April 13th, he fainted and slid out of his chair to the floor. He had convulsive movements for about a minute and then grew deathly pale and pulseless. His pupils were widely dilated and he was apparently dead. I was summoned by one of his neighbors who in a perfectly calm manner told me that she thought the man had passed away but asked me to come to see him.

When seen twenty minutes later he still had the ashy pallor and wide pupils of impending death, but was conscious. Pulse and heart action were very feeble; body was drenched with cold sweat. After about ten minutes, a mild convulsion occurred. His condition was so desperate that I could not remove him from the floor for about an hour and then only to a bed which had been brought down stairs and set up in the room where he lay.

Vigorous hypodermic stimulation with caffeine and digitalis was continued through the night and he was brought by ambulance in the morning to the hospital. Bowel movements passed during the night were intensely offensive with the odor of putrefaction and fermentation.

Physical examination April 14th gave the following findings:

(1) The skin and mucous membranes are markedly pale, almost white; right pupil responds to light, left does not.

(2) There is considerable evidence of pyorrhea and there are several crowned teeth, many or all of which may be infected.

(3) The heart is definitely enlarged and its transverse diameter and the vessels at the base are also increased in size. There is a systolic blow at the base extending upward, a definite pericardial friction rub; first sound at the apex is decidedly poor in quality but no murmur is noted in this area. PMI in the fifth space 5½ inches from the midline.

(4) The lungs show dullness, bronchial breathing and diminished fremitus at both bases, especially the left.

(5) The abdomen is generally distended and tympanitic; no enlargement of spleen or liver.

Temperature on admission 99.4, pulse 84, respiration 22. Temperature rose on second day to 102 and then gradually declined. It did not reach normal until May 1st. The pulse in general kept pace with the temperature throughout the course of the disease. The respirations reached their highest point at 36 on the evening of the second day.

Urine gave positive reaction for albumin and showed the presence of hyaline and granular casts as well as some pus cells. These findings gradually cleared up so that at the time of dismissal from the hospital the urine was practically normal.

*A Clinical Case presented before a Staff Meeting of the Riverside Hospital, Jacksonville, July 17, 1923.

Blood examination April 14th showed hemoglobin 30 per cent, red cells 2,760,000, leukocytes 10,600, differential count showed definite increase in polynuclears. Leukocytes reached their highest point, 16,000, on the 16th of April.

It will be noted that the blood examination shows a minus color index instead of the plus index which should be present if the diagnosis of pernicious anemia be correct.

Normoblasts were found fairly abundantly which seemed to confirm the diagnosis of pernicious anemia.

No parasites were found in the blood at any time.

Re-examination of the chest on April 15th gave the following findings: Dullness to flatness over the lower half of the left lower lobe posteriorly, shading into the axilla. Voice and breath sounds in this area are bronchial and fremitus is diminished. There is no cough. The same physical findings exist in a small area at the right base.

Diagnosis: hydrothorax, left chest.

Findings in the chest were confirmed by fluroscopic examination, made April 17th.

"Fluroscopic Examination, A. D. S., Age 60, Riverside Hospital.

Screen study of chest today shows the heart rather markedly enlarged toward the left side. The vessel shadows also show a moderate enlargement in their transverse diameter. The heart action appears feeble and very rapid. Screen study of the chest shows a relatively normal illumination of the right side: the movements of the right diaphragm were good. The left chest showed the presence of fluid at the left base; this was moderate in amount but seemed to obliterate the costal angle of the left pleural cavity. The movements of the left diaphragm were obscured and could not be made out with any degree of certainty.

Findings indicate an enlargement of the heart and vessel shadows associated with a moderate amount of fluid in the left pleural cavity."

Pericardial friction murmur persisted throughout the time of the patient's stay in the hospital, although the evidence of acute pericarditis gradually disappeared in the course of about three weeks.

The fluid in the left chest absorbed fairly quickly and was gone by the last of April at which time a pleural friction rub could be heard.

There was considerable abdominal distention throughout the early days which gradually subsided after the intestinal tract was cleared and normal stools were obtained. It is interesting to note that the stools were clay-colored for a long period. I have no explanation to offer for this. There was no jaundice at any time and the stools were negative for blood, mucus and parasites. They have regained a normal color.

After the abdomen had flattened out, the spleen was palpable but, as reported previously, no parasites were found in the blood.

Blood chemistry on April 26th to determine retention of urinary solids showed a slight increase in nonprotein nitrogen and about twice the normal figures of urea and urea nitrogen. There was no increase in creatinine.

To return now to the blood picture, the hemoglobin and red cells both increased definitely during the patient's stay in the hospital and on April 26th the findings were as follows: red blood cells, 3,288,000; white cells, 6,000; hemoglobin, 42 per cent. On May 4th red cells were 3,396,000; white cells, 6,200; hemoglobin, 58 per cent.

Normoblasts were found daily up to April 23rd, but none after that time, and it is interesting again to call attention to the point that the patient's color index was always minus. This one finding made the diagnosis of the blood condition a secondary and not a primary form of anemia which has been confirmed by his rapid improvement as well as the discovery of other pathology to account for his condition.

The condition of his teeth, which had attracted attention at his first examination, was investigated definitely by X-ray examination, made April 16th. Evidence of root and apex infection in several teeth, enough to account, in my opinion, for the whole clinical picture, was observed.

No other source of infection has been demonstrated.

The patient's progress since leaving the hospital has been continuous. His weight has gradually increased until at the present time he weighs 167½ pounds, which is about 10 pounds below his normal weight. I do not know what his weight was when he was admitted to the hospital. My first observation was made on May 22nd at which time he weighed 161½ pounds.

His general strength has kept pace with the improvement in his general health and blood picture and he is able at the present time to carry on his work, although he has been instructed to travel in second speed.

Pesicardial friction rub has disappeared since about the middle of May and the left pleura is clear and normal.

The blood picture on May 24th showed red count 4,056,000, white count 5,000, hemoglobin 60 per cent; on June 14th, red count 5,000,000, white count 6,000, hemoglobin 65 per cent.

At the present time the hemoglobin is approximately 75 per cent. It shows no disposition to rise above that figure, where it has been for practically a month.

The blood pressure, which was reduced to about 110 systolic on the night of the patient's attack, rose to 170 two days after, and since then has gradually subsided. Blood pressure July 12th was 146-100.

Blood Wasserman was negative; there was no investigation of spinal fluid.

It is interesting to note that this improvement has all been brought about by general medical care.

The infected teeth, which are presumed to be the cause of illness, have not been removed. If the patient had not progressed satisfactorily, this would have been done at any time, but in the face of definite improvement it seemed wise to wait until a stationary point was reached. I believe that point has been reached at the present time and that the infected teeth should now come out. The patient will bear me out in the statement that I have urged that course, but that the matter has been postponed for reasons which seem adequate. He has been told that delay involves risk which is a point that I am sure you will all agree upon. Personally, I am quite sure that in spite of the enormous gain made in this case, there will be a recurrence of trouble unless the offending teeth are removed.

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NON-SURGICAL DRAINAGE OF THE BILE CHANNELS; A PRELIMINARY REPORT OF THE USE OF THE DUODENAL TUBE AS A DIAGNOSTIC AND THERAPEUTIC AGENT IN CHRONIC BILIARY DISEASE.*

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This subject should challenge the interest of all medical practitioners, be they general or special. We remember that, as has been reiterated so often as to become trite, a large per- is heir have their origin in the gastrointestinal centage of all the ills to which the human race tract; that the military commanders of all time realized the efficiency of their fighters was in direct proportion to the proper digestive functions in these men; we remember that our grandfathers in medicine recognized, in an obscure way, some direct connection between biliary and alimentary malfunction, arbitrarily coining the all-encompassing term "biliousness" to describe in a measure a condition they sensed but could not prove; we know that our modern internists and surgeons are realizing more and more the common incidence of bile-channel involvement to alimentary malfunction in so numerous a class of patients as is the latter and are manifesting great zeal in developing rational measures of prevention and correction of such disturbances. Remembering these things, our interest should require no stimulation. We are achieving methods which render obsolete the old term, placing at hand expedients for *proving* what in the past was merely *guessed* at . Our interest cannot languish when we remember further that we are all constantly in touch with patients who, because of their seemingly obscure and irrelevant symptoms, continue to suffer through our neglect in sifting their cases to the very bottom. One of the most pitiable conditions confronting us is that of the sufferer of some chronic gastrointestinal malady, too often undiagnosed. First, we fail in treating him, then we pity, then endure, and finally, ignore him.

Patients come for relief of probably as great a diversity of symptoms in biliary diseases as in any other condition in medicine. Careful survey of cases not even suspected of such involvements often points to some acute or chronic pathological condition of the liver, gall-bladder, or bile channels. A case may present any one or all of such symptoms as chronic constipation, mild or severe headaches, vertigo, tinnitus aurium, spots before the eyes, anorrhexia, gastric pain, nausea and vomiting, flatulence, dyspnoea, general malaise, insomnia, loss of weight, indefinite lower abdominal pain, sometimes pain referred definitely to appendiceal region, etc., etc., and unless accompanied by pain in the gall-bladder region, jaundice, gall-stone colic, positive X-ray findings or other more typical symptoms, the possibility of biliary-tract involvement may be entire-

*Read before the Fiftieth Annual Meeting of the Florida Medical Association, held at Jacksonville, May 15, 16, 1923.

ly overlooked. We should not look for the characteristic symptoms; they may have been present and subsided before the patient comes to us and may be entirely replaced by more acute gastric symptoms or numerous obscure chronic ones. A host of these may be present, any one of whose neglect may be our undoing.

Last year, in a paper read before this society, I attempted to discuss briefly the part played by the duodenal tube in the diagnosis and treatment of affections of the gastrointestinal tract and its tributaries. The more specific object of this paper will be the discussion of its use in facilitating the diagnosis and treatment of bile tract involvements. The method is new, and while much original work is yet to be done, and physiologic phenomena to be explained, immediate results in numerous cases where surprisingly quick relief of pain and cessation of symptoms have rewarded its use intrigues the interest, and encourages one in persistent effort on cases that at the outset appear so chronic and obscure as to be almost hopeless.

In this discussion the references to the bile tract are intended to include the secretory hepatic cells, the collecting hepatic ducts, the main hepatic duct, the cystic duct, the gall-bladder, and the common bile duct; in other words, all of the channel concerned with the elaboration and discharge of bile, from the cells secreting it in the liver to the end of the duct emptying it into the duodenum at the ampulla. Disease of the bile tract may manifest itself in any or all of these regions, even to being a primary involvement of nerve supply to the secretory hepatic cells. Bearing these facts in mind, it can easily be understood why the word "obscure" is used in reference to some of our conditions, and why many of the gastroenterologists here and abroad are so diligent in this work, and are so certain that perfecting the newer methods of observation and diagnosis will add much to internal medicine and surgery.

I am persuaded that a lengthy discussion of a long series of case reports detracts rather than adds to the interest of a paper read to an audience naturally more interested in general than in technical features. With your indulgence therefore, this paper will represent an effort to discuss informally the use of the duodenal tube in the diagnosis and treatment of biliary involvements. A few brief case reports will appear later to present the interesting clinical features and results of the work. Those who wish may review them when the article is published. Later reports will cover a series of about fifty cases.

The anatomy of the liver and bile passages is familiar to you all. The physiology of the tract and the functions of its secretion are more elaborate than their apparent unimportance might lead us to believe. The older practitioners recognized their disturbances, in conjunction with those of the intestinal tract, to be very common, and were prone, as we may infer, to apply to them their descriptive term "biliousness" already mentioned. Recent experiment and study demonstrate that the term is inadequate and misleading, and that the liver and bile channels are a quite complex and highly specialized group-organ. More of the physiology and function of bile is yet to be learned, but this we know: normal bile has two important offices; first, as a vehicle for the elimination of waste products thrown off by the great filter, the liver, and second, as an aid in intestinal digestion and absorption. Broken-down blood cells and debris and many of the products of katabolism are filtered from the body by the liver and are elaborated in the bile for elimination by way of the intestinal tract. Coincident with this office of elimination, the bile has been assigned a further function by nature, its aid to the intestines as stated above. Most physiologists seem to agree that it assists in the emulsification of fats, acts as an extremely necessary lubricant for the alimentary tract, and as a mild disinfectant for the upper and lower bowel. Now here we have a peculiar situation in body economy; we have a body fluid which is at once excretory and secretory, whose function is that of an important adjunct to digestion and assimilation, and at the same time is that of a vehicle for the elimination of waste products dissolved within itself. Physiologic function of the liver being normal, this dual function is performed undisturbed, but let congestion of the bile tract or of the intestinal canal, involvement of the liver, infection even of some distant organ develop, and it can readily be seen that a hazard promptly ensues. Where we have had a normally flowing stream promptly carrying its waste products out of the body, we now have a stream the very nature of which, having become stagnant or arrested, promotes an open door for fermentation and putrefaction, and provides a perfect medium for the development of pathogenic bacteria. The gall-bladder, whether it be simply a

reservoir, or, as is more probable, acts as a pressure equalizer, now appears in the limelight, for regardless of in what part of the bile tract involvement may begin, the gall-bladder in a great majority, if not all of the cases, soon becomes affected. Its very nature as a reservoir, its location, form, and dependence upon a small duct for drainage all tend to make it a ready seat for degeneration and infection of its contents when malfunction of some part of the tract exists.

It is the belief of the writer that relatively few, if any, gall-bladder diseases occur primarily in the gall-bladder itself, where the rest of the bile passages, the flow of bile, and intestinal elimination are normal, but that they occur secondarily to involvement outside itself. Experience further bears out the belief that in a general bile passage involvement, the gall-bladder is the last unit to assume a normal state under therapeutic methods applied directly to these channels, because of its same peculiarities mentioned above as aiding infection.

As we see now, from the very nature of the fluid it carries and its own physical characteristics, that the biliary system offers a ready field for pathologic involvement when its functions are disturbed from any cause, and as we know that these functions are closely related to those of alimentary elimination, disturbances of which are so woefully common in this age of mental advancement and physical neglect, we can understand why cholecystitis, cholelithiasis, and kindred involvements are prevalent. But recognizing these conditions in their incipiency is not easy nor is it usual.

Bile channel involvements may be manifested by symptoms as unmistakable as those of gallstone colic or obstructive jaundice, or by symptoms so obscure or irrelevant as to engender no suspicion of biliary disease. The latter are of such frequence that the writer places bile tract involvement along with hookworm as the first conditions coming under the process of elimination in all gastrointestinal cases presenting themselves, other than children.

The orthodox symptoms of biliary diseases are familiar to you. The newer phases of symptomatology are elaborated upon in a number of recent contributions to medicine. Remembering that of the five great areas of focal infection, namely, sinuses, teeth, tonsils, gall-bladder, and appendix, stagnant bile offers probably the most fertile soil for bacterial growth, and remembering its coincidental involvement with many conditions so common in the bowel, it can be seen that a deaf ear should never be turned to symptoms, no matter how obscure they may be, that might indict the bile channels.

The Use of the Duodenal Tube in Bile Channel Affections.

In the duodenal tube, a relatively recent addition to our medical armamentarium, we have a most useful little piece of mechanism for aiding in diagnosis and treatment of diseases of the gastrointestinal tract and its tributaries. Granting that all claimed for it in bile passage disorders is on trial until unquestionably accepted, its value as an aid has been definitely proved and is beyond dispute. First, in the reclaiming of gastric contents, the analysis of which should always be made in suspected bile-channel involvement, our duodenal tube is infinitely more to be preferred than the old-fashioned stomach tube, both from the standpoint of ease of manipulation by the operator and of comfort of the patient. The tube is quickly passed, the stomach contents obtained, and the patient may then be placed in the proper position for the tube to pass by gravity into the duodenum. The time required for the latter to occur may be from one-half to three or four hours, depending on several factors. In cases of pyloric spasm an overnight period may be required. When the bulb is in the duodenum, normal contents of the latter may be aspirated for determining pancreatic function. Salt solutions are now introduced into the duodenum to stimulate the flow of bile. Various salts are used for this purpose, the more common ones being sodium phosphate, sodium sulphate, magnesium sulphase, and magnesium citrate. Various others are used, as are combinations of two or more. The writer has found the ones best suited to be a saturated solution of sodium phosphate of a 50 per cent solution of magnesium sulphate, the latter being the most satisfactory.

As to the physiologic action of the solutions when instilled into the duodenum, controversy still waxes warm. Whether it be stimulation of the duodenal mucosa with contraction of contiguous structures, direct stimulation of the nerve endings in the mucosa and reflexly of the gall-bladder musculature, reflex stimulation of the hepatic secretory cells, whether its acts as a solvent of obstructive material, or performs all of these phenomena combined, or still others, the fact remains that bile flow is increased and be-

comes more rapid when the solutions are instilled directly into the duodenum. The writer has observed cases of acute jaundice where no bile would flow immediately following the instillation, but where later there would suddenly be a veritable gush of bile containing flocculi, plugs of mucus, disintegrated cells, and debris, which inclines one to the belief that in some cases obstructions of the common duct have simply been dissolved by the solution used and free flow instituted.

The changes of color in normal bile are marked and are of considerable significance as a basis of comparison with those of abnormal bile channel contents. The first bile is light lemon-colored, and later becomes darker and more viscid, this probably from the gall-bladder; still later it is again light golden yellow, probably from the hepatic ducts and cells. The chief point of interest is that abnormal bile, from whatever part of the channels it may come, has characteristics markedly at varience with those of the normal fluid. In a majority of cases of the involvements under discussion, this is the picture that the bile discloses: after the first light-colored duodenal contents, bile appears that is thick and viscid, dark green colored, or even tarry black; it contains particles or flocculi plainly visible while drainage is in progress, it is ropy and evidently full of mucus, all of this in contradistinction to normal bile. Now it were unreasonable to assume that we can blindly assign *pathologic* bile to certain definite parts of the bile channels with the same assurance that we do with normal bile, and in my opinion it is not necessary to do so. As stated previously in this paper, and as borne out by observation on these cases, the gall-bladder is practically always itself involved, and our attention manifestly centers upon this organ, especially as medical treatment is essentially the same whatever the part, or parts, involved.

Microscopically, pathologic bile presents some or all of the following features, depending upon the degree of involvement: mucus, shreds of epithelium, white blood cells often to the extent of pus, red blood cells, fragments of mucus membrane, bacteria, and sometimes cholesterin crystals and fine particles of sand-like material. The latter two features point strongly to gall-stones, the others to different degrees of infection. Culture of such bile usually develops the presence of staphilococcus-albus, the significence of which I am not prepared to discuss, as I am not certain that uncontaminated bile-channel contents can be obtained by the duodenal tube, and furthermore have at various times found what was apparently normal bile obtained through the tube to be in some cases positive and in others negative for the microorganisms mentioned.

It is reasonable now to assume that the presence of such abnormal bile as has been described prompts the diagnosis of bile-channel pathology. In those cases where gall-stones are indicated, unquestionably surgery is the proper method of treatment, and delay increases the hazard. But even in these cases, where age or general physical condition make surgical procedures inadvisable, definite palliative effects can often be obtained by the duodenal lavage which will presently be described.

The duodenal tube, it is of course understood, as a diagnostic measure is used in conjunction with the usual expedients such as history, complete physical examination, examination of the stool and urine, of the blood, use of the x-ray, etc. Conversely, any attempt to diagnose other than the patent and unmistakable bile channel involvements without recourse to the duodenal tube is denying oneself the use of one of the most potent measures at hand.

Treatment, regarding chiefly gall-bladder disease, may be medical or surgical. In cholelithiasis, as I have stated, there is no choice. Manifestly stones cannot be coaxed out through a small rubber tube, even if they could be brought to the duodenum and forced into it. Likewise it were natural to regard an acute catarrhal jaundice as properly a case for medical treatment. As to the many other conditions of inflammation, acute and chronic, it is not my purpose to promote or engage in any controversy with the surgeons as to methods that should be employed. Their cases of cholecystectomy and cholecystotomy have presented enough not entirely satisfactorily sequelæ for them to accord my methods the same deference as I accord theirs.

Medical treatment first consists of the usual procedures as to proper alimentary elimination, diet, hygiene, general symptomatic, etc., except that the use of the cholagogic salts given by mouth in the old way is not indicated, as the duodenal instillation accomplishes the same thing directly and with much greater certainty. The routine use of the tube is as follows: Fifty cc. of the solution chosen is allowed to enter the duodenum by gravity and remain five minutes. It is then

either aspirated with a syringe, or, as the writer prefers, allowed to return by gravity, the distal end of the fluid-filled tube depressed two or three feet below the level of the prone patient, thereby instituting syphonage. While this method may be somewhat slower than the other, it is preferable because the suction is then gentle but constant, and free from the possibility of causing abrasion of the duodenal mucosa by suction too vigorously applied. Bile flow is established after a waiting period dependent upon the degree of congestion, especially of the common duct, and may be immediate and rapid or delayed and slow. Periodic flow and cessation develop every alternate few minutes. Flow is further increased by gentle massage of the gall-bladder region, and is sometimes markedly increased by the patient's sneezing, coughing, or laughing, this being due to increased intra-abdominal pressure. The induced flow can be maintained indefinitely, from a few minutes in neurotic patients to even several days in those who desire the maximum of immediate effect. The end in view is the reclamation of clear, normal bile. While this is not possible in one drainage in all cases, in others one prolonged drainage accomplishes the desired result with cessation of symptoms for periods of from several months to years. The reason for the end desired being the flow of clear, normal bile resolves itself into the essential of the treatment. Be the condition common duct obstruction by inflammatory products, inflammation of the gall-bladder, or of any part of the bile passages, the object is the removal of the inflammatory products, the emptying of the gall-bladder of its infected bile, and the stimulation of bile secretion, for as soon as the abnormal contents are removed the flow of normal bile institutes a washing out of the tract, and stimulates a return of normal secretory function, and, if we accord the credit to the procedure justified by the results we must agree that it accomplishes in a very short time what the older medical methods of orally administering cholagogues required weeks and months to do, with many cases showing no improvement whatever.

As the case reports are to appear later, I will offer a brief review of a few cases as groups simply to crystalize the points presented as salient in this paper. They may be grouped as follows, according to pre-drainage diagnosis:

Acute catarrhal jaundice, 5.
Acute cholecystitis without jaundice, 3.
Chronic appendicitis, possible cholecystitis, 1.
Duodenal ulcer, 1.
Cholelithiasis, 2.
Gall-bladder migrane, 1.
Chronic cholecystitis, 37.

Chronic constipation existed in all. Gastric disturbances in varying degrees were also present. But presence of pain, its location, severity, relation to taking of food, duration, etc., was not typical in all cases.

In the five cases of acute catarrhal jaundice, symptoms of nausea, vomiting, headache, constipation, etc., cleared up in from two to four days. Drainage in each case was instituted three times, four days apart, the tube being left in place for about twelve hours in each instance. The jaundiced skin was slow to clear up, and this was a question of desquamation and blood-absorption of pigment and was not related to the drainage after bile became normal.

Of the three cholecytitis (acute) without jaundice, one proved to be that of gall-stones, but the patient declined operation. The symptoms of nausea, vomiting, etc., followed the same course as did the jaundice cases. The case with stones received the same treatment as the others, and as there was never a history of colic, it is assumed the stones were all large. No recurrence of symptoms up to the present time, one year after drainage, has developed.

A case diagnosed as chronic appendicitis, with a possibility of gall-bladder disease, gave a clinical symptomatic picture of appendicitis, but with a more severe chronic gastric involvement than is usual with this condition. There was no pain or other symptom referable directly to gall-bladder affection. Drainage revealed badly diseased bile. Recovery with no recurrence of symptoms up to present (eighteen months).

One case, provisionally diagnosed as duodenal ulcer because of some characteristic symptoms of this disease and a complete lack of those of biliary involvement, and where the x-ray left some doubt as to the exact nature of the duodenal deformity, proved on drainage to be a chronic bile channel disturbance. The usual duodenal lavage, with general and dietetic treatment, have given relief from symptoms for two years.

comes more rapid when the solutions are instilled directly into the duodenum. The writer has observed cases of acute jaundice where no bile would flow immediately following the instillation, but where later there would suddenly be a veritable gush of bile containing flocculi, plugs of mucus, disintegrated cells, and debris, which inclines one to the belief that in some cases obstructions of the common duct have simply been dissolved by the solution used and free flow instituted.

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It is reasonable now to assume that the presence of such abnormal bile as has been described prompts the diagnosis of bile-channel pathology. In those cases where gall-stones are indicated, unquestionably surgery is the proper method of treatment, and delay increases the hazard. But even in these cases, where age or general physical condition make surgical procedures inadvisable, definite palliative effects can often be obtained by the duodenal lavage which will presently be described.

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Treatment, regarding chiefly gall-bladder disease, may be medical or surgical. In cholelithiasis, as I have stated, there is no choice. Manifestly stones cannot be coaxed out through a small rubber tube, even if they could be brought to the duodenum and forced into it. Likewise it were natural to regard an acute catarrhal jaundice as properly a case for medical treatment. As to the many other conditions of inflammation, acute and chronic, it is not my purpose to promote or engage in any controversy with the surgeons as to methods that should be employed. Their cases of cholecystectomy and cholecystotomy have presented enough not entirely satisfactorily sequelæ for them to accord my methods the same deference as I accord theirs.

Medical treatment first consists of the usual procedures as to proper alimentary elimination, diet, hygiene, general symptomatic, etc., except that the use of the cholagogic salts given by mouth in the old way is not indicated, as the duodenal instillation accomplishes the same thing directly and with much greater certainty. The routine use of the tube is as follows: Fifty cc. of the solution chosen is allowed to enter the duodenum by gravity and remain five minutes. It is then

either aspirated with a syringe, or, as the writer prefers, allowed to return by gravity, the distal end of the fluid-filled tube depressed two or three feet below the level of the prone patient, thereby instituting syphonage. While this method may be somewhat slower than the other, it is preferable because the suction is then gentle but constant, and free from the possibility of causing abrasion of the duodenal mucosa by suction too vigorously applied. Bile flow is established after a waiting period dependent upon the degree of congestion, especially of the common duct, and may be immediate and rapid or delayed and slow. Periodic flow and cessation develop every alternate few minutes. Flow is further increased by gentle massage of the gall-bladder region, and is sometimes markedly increased by the patient's sneezing, coughing, or laughing, this being due to increased intra-abdominal pressure. The induced flow can be maintained indefinitely, from a few minutes in neurotic patients to even several days in those who desire the maximum of immediate effect. The end in view is the reclamation of clear, normal bile. While this is not possible in one drainage in all cases, in others one prolonged drainage accomplishes the desired result with cessation of symptoms for periods of from several months to years. The reason for the end desired being the flow of clear, normal bile resolves itself into the essential of the treatment. Be the condition common duct obstruction by inflammatory products, inflammation of the gall-bladder, or of any part of the bile passages, the object is the removal of the inflammatory products, the emptying of the gall-bladder of its infected bile, and the stimulation of bile secretion, for as soon as the abnormal contents are removed the flow of normal bile institutes a washing out of the tract, and stimulates a return of normal secretory function, and, if we accord the credit to the procedure justified by the results we must agree that it accomplishes in a very short time what the older medical methods of orally administering cholagogues required weeks and months to do, with many cases showing no improvement whatever.

As the case reports are to appear later, I will offer a brief review of a few cases as groups simply to crystalize the points presented as salient in this paper. They may be grouped as follows, according to pre-drainage diagnosis:

Acute catarrhal jaundice, 5.
Acute cholecystitis without jaundice, 3.
Chronic appendicitis, possible cholecystitis, 1.
Duodenal ulcer, 1.
Cholelithiasis, 2.
Gall-bladder migrane, 1.
Chronic cholecystitis, 37.

Chronic constipation existed in all. Gastric disturbances in varying degrees were also present. But presence of pain, its location, severity, relation to taking of food, duration, etc., was not typical in all cases.

In the five cases of acute catarrhal jaundice, symptoms of nausea, vomiting, headache, constipation, etc., cleared up in from two to four days. Drainage in each case was instituted three times, four days apart, the tube being left in place for about twelve hours in each instance. The jaundiced skin was slow to clear up, and this was a question of desquamation and blood-absorption of pigment and was not related to the drainage after bile became normal.

Of the three cholecytitis (acute) without jaundice, one proved to be that of gall-stones, but the patient declined operation. The symptoms of nausea, vomiting, etc., followed the same course as did the jaundice cases. The case with stones received the same treatment as the others, and as there was never a history of colic, it is assumed the stones were all large. No recurrence of symptoms up to the present time, one year after drainage, has developed.

A case diagnosed as chronic appendicitis, with a possibility of gall-bladder disease, gave a clinical symptomatic picture of appendicitis, but with a more severe chronic gastric involvement than is usual with this condition. There was no pain or other symptom referable directly to gall-bladder affection. Drainage revealed badly diseased bile. Recovery with no recurrence of symptoms up to present (eighteen months).

One case, provisionally diagnosed as duodenal ulcer because of some characteristic symptoms of this disease and a complete lack of those of biliary involvement, and where the x-ray left some doubt as to the exact nature of the duodenal deformity, proved on drainage to be a chronic bile channel disturbance. The usual duodenal lavage, with general and dietetic treatment, have given relief from symptoms for two years.

One most unusual condition was that of a physician's wife. For over ten years she had been suffering from a periodic migraine of the most distressing type, accompanied always by severe nausea and vomiting. Acute jaundice had never been present. Beginning with attacks lasting not over a day, and appearing weeks apart, the symptoms became gradually more severe over the period of years until, when seen by the writer, the wretched condition lasted for several days, the extreme nausea and continual vomiting preventing the taking of nourishment. The attacks were now about ten days apart. You can visualize the degree of debility in this patient. Many expedients for relief had been resorted to without effect. As bile was always vomited at the time of the acute attacks, and as relief seemed to depend on a quantity of it being so discharged, duodenal drainage was instituted. The ensuing attacks were anticipated each time with a drainage until ten had been done, with progressive improvement. The bile proved to be that of a chronic cholecystitis. The attacks were now about a month or more apart, the acute periods reduced from three or four days to one, and the severity of the migrane distinctly lessened. This patient had the last drainage eight months ago. Another series is to be instituted with the expectation of still further improvement.

Of the other thirty-seven cases the diagnosis of chronic cholecystitis proved to be correct. The drainage in each case was from one to four times, depending, as has been described, on the recovery of normal bile. Four of these cases had a second series of drainage six months after the first, and still another after one year, not because of a recurrence of the symptoms, but as a measure deemed advisable in view of the resistance to the first treatments. Thirty-four of the 37 cases have had no recurrence of symptoms; two cases had complete relief for two months, followed by a recurrence much milder than the first involvements and are still under treatment. One case, a neurotic individual, showed no improvement whatever from the first drainage and declined to submit to further ones.

This is a mere outline of treatment and results in these cases; to appreciate the importance of the use of the tube in the diagnosis of many of them where the symptoms were obscure, a review of the case histories to appear later is suggested.

CONCLUSIONS.

1. Bile tract involvements, especially secondary to gastric and alimentary disturbances, are of very common occurrence.

2. Owing to frequent obscurity of the symptoms, biliary diseases are often overlooked.

3. The duodenal tube is a most valuable diagnostic adjunct in determining the condition of the bile channels in suspected pathology, and of affections of the stomach so often secondary to biliary disease.

4. As a therapeutic agent in diseases of the gall-bladder and bile passages the tube has unquestionably demonstrated its usefulness, and gives promise of much further development.

The writer lays claim to no originality of method in the foregoing discussion except that the conclusions are his own and are based on his personal observations. Others are doing this work, many of them have observed series greatly in excess of his in numbers, and their conclusions may not be in accordance on many points. But the work is going on, time will settle all contentions, and medicine will be the gainer.

If this discussion engenders greater interest in many of our obscure gastrointestinal conditions, if some of the chronic sufferers thereby gain relief, and if others with such involvements in their incipiency are saved future suffering, then the writer will feel amply repaid for this modest but sincere effort.

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DIABETES MELLITUS: THE CARDINAL PRINCIPLES OF TREATMENT.*

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The treatment of diabetes mellitus can with greatest advantage be conducted in a clinic or other institution to which come large numbers of diabetics. This chiefly because of its educational value to the patient. However, we seldom have things in life just as we want them, and we must learn to cope in the most efficient manner possible with conditions as we find them. This applies with particular force to the practice of medicine and incidentally to the treatment of diabetes mellitus. The man engaged in general practice fre-

*Part of a discussion on diabetes held at a meeting of the Southeastern Division of the Alabama State Medical Association, August 21, 1923.

quently encounters diabetics who cannot afford to visit a specialist and whose treatment must be instituted and conducted in its entirety at home. With the proper painstaking care this can be done.

It is of the treatment of diabetes with those facilities which are found in the country or the small town that I wish to speak. Without pausing to give credit to the men who have emphasized these principles, it can be said that seven cardinal principles govern the successful treatment of this disease.

First is the education of the patient. In a disease the duration of which is years and in which everything depends upon intelligent cooperation, the patient must thoroughly know the nature of his malady. He must be taught to compute food values, to examine the urine, to recognize the signs of impending danger, such as acidosis or insulin shock, and to appreciate the objects of treatment. This can best be accomplished by placing in his hands certain elementary books such as Joslin's, or Wilder's manuals, or Locke's book on food values, and above all by frequent conferences.

The second principle is that of undernutrition. The patient's metabolism must be kept low and to this end he should be permitted only such food as is necessary to meet his minimal metabolic requirements and to prevent his drawing upon his own body tissues. The basal metabolic requirements are proportionate to the surface area of the patient's body. Formulæ have been devised to facilitate these computations, but even these are not essential. If we base our estimate of his requirements upon the fact that the twenty-four-hour basal metabolism, while the patient is at rest, approximates twenty-five calories per kilogram of the body weight, we are not likely to go far wrong. With our scales it is necessary also to remember that two and two-tenths pounds make one kilogram. Frequent weighings serve as a control upon the accuracy of these estimates, for if a patient is gaining weight (in the absence of œdema) it is evident that his food intake exceeds his maintenance requirement, while if he is losing weight (and the urine contains no sugar) it is equally evident that he is not metabolizing sufficient food to meet this requirement.

The third principle concerns the well-known rule of carbohydrate restriction. To rest the pancreas the patient must be given only such an amount of carbohydrate as he can completely metabolize, and which will not lead to the appearance of sugar in the urine. The untreated diabetic grows worse because the excess of unutilizable sugar circulating in his blood makes impossible demands upon the islands of Langerhans. This leads to exhaustion and final degeneration of these cells. To keep the ingested carbohydrates within his tolerance is the only means of halting this downward process. If his tolerance in this respect is low he must then be given insulin. Someone may say, "But blood-sugar estimations cannot well be made away from the medical centers." The answer is that while blood-sugar estimations are of great value, they are not a *sine qua non*. Systematic urine examinations can be made to serve as a reliable guide to treatment.

The fourth principle is that of low protein intake. Since protein, through its specific dynamic action, hastens metabolism, to permit more than the patient actually needs would be to violate the important principle of minimal metabolism. For an adult it is estimated that a daily protein intake of two-thirds of a gram per kilo of body weight is sufficient; for a child, one gram per kilo is required. More than this should seldom be given.

The fifth principle concerns the amount of fat which can be permitted with safety. The quantity of fat which a patient can take without the production of fatty acids and the appearance of coma depends upon the amount of carbohydrate which he matabolizes. As has been aptly said, the fats burn in the fire of the carbohydrates and if there is too much fat the fire smokes. The acetone bodies have been likened to the smoke. It is estimated that the patient can safely burn two grams of fat for every one gram of carbohydrate metabolized. In this computation one-half of the protein is reckoned as carbohydrate. If the fats exceed this ratio coma may supervene.

The sixth principle is that of good hygiene. The diabetic should studiously observe the principles of hygiene. Sufficient rest; a reasonable amount of exercise and of recreation; the avoidance of worry, overwork and undue excitement, are all of great importance. Of greatest importance in this connection, perhaps, is the avoidance of bacterial infection.

As a seventh principle, the patient should not be given insulin unless it is needed. The very

mild diabetics and the arteriosclerotics, who occasionally have a little glycosuria, but who can metabolize a satisfactory maintenance diet without glycosuria, do not need insulin. All others do. I have been using insulin with great satisfaction about nine months. Approximately one-third of the patients who have come to us, after their tolerance has been determined and the diet arranged, have gone home without taking insulin. The other two-thirds are now taking it with an average daily dose of about twelve units. They have all learned, not only to arrange their diet, but to administer to themselves their own insulin.

Briefly, then, to determine the appropriate diet for a diabetic, the following procedure is suggested: Multiply the patient's weight in kilograms by twenty-five and take this figure as the minimal number of calories required. Add 500 calories if he is to be up and about. Give two-thirds of a gram of protein daily per kilo of body weight. The carbohydrate tolerance is determined experimentally by beginning with a diet of very low caloric value and increasing the carbohydrates daily until sugar appears in the urine. An amount slightly less than this should be prescribed. Then, after computing the caloric value of the proteids and carbohydrates thus permitted, there should be added sufficient fats to bring the total figure up to the number of calories originally estimated as needful, provided, however, that the carbohydrate-fat ratio of one to two is not exceeded.

If the diet thus based upon the patient's carbohydrate tolerance does not permit enough food to meet his metabolic requirements, then a sufficient dosage of insulin should be given and the carbohydrates and fats proportionately increased. One unit of insulin will permit him to metabolize one and one-half to two and one-half additional grams of carbohydrate, and this in turn three to five additional grams of fat.[1]

As an example: If the patient weighs one hundred and twenty pounds (fifty-five kilo), he will require daily 1375 calories, or if he is out of bed, 1875 calories. He should be given on the basis of his weight thirty-six grams of protein. Assume that sixty-five grams of carbohydrate has been found to be the limit of his tolerance, and that we can safely give him sixty grams. The protein and carbohydrate each yield four calories to the gram, which in this case would provide 384 calories daily. There would then remain 1491 calories still to be provided. At nine calories to the gram it would require 165 grams of fat to meet this deficit. Since the total glucose metabolized by him is only 78 grams (60 grams plus the 18 grams of glucose yielded by the protein) the carbohydrate-fat ratio of safety would be exceeded. This amount of fat would be dangerous. Give, then, daily fifteen units of insulin to take care, say, of an additional twenty-five grams of carbohydrate. Now, with 103 (85 plus 18) grams of carbohydrate, only 154 grams of fat would be required to provide a maintenance diet, which is well within the limit of safety.

To summarize: The treatment of diabetes can be most advantageously instituted and planned where methods of precision and facilities for instruction of the patient are of easy availability, but such surroundings are not essential. Thorough familiarity on the part of both patient and physician with the objects and methods of treatment, together with intelligently planned and painstakingly controlled diet at home, will often bring satisfactory results.

1. Since the above was written the strength of insulin has been increased forty per cent.

SOME OF THE HYGIENIC ACTIVITIES OF THE NAVAL AIR STATION, PENSACOLA, FLORIDA.*

LIEUTENANT COMMANDER HOWSON W. COLE, *Medical Corps, United States Navy.*

Hygiene has been defined as "that branch of medical science which concerns itself with the preservation of the health of individuals and communities. It is an attempt to render growth more perfect, decay less rapid, life more vigorous and more prolonged, and death more remote. It is concerned with all the agencies which pertain to or affect the physical condition or mental state of man in his diverse environment and his manifold activities."

In order to intelligently solve the complex problems which constantly face the naval medical officer, we must orient ourselves and realize that our duties require us today to care for men aboard ship and tomorrow for men in camp or in barracks ashore. The sailor's duties take him far afield, sometimes ashore, sometimes afloat, often in the air and under water in submarines or div-

*Read before the Escambia County Medical Society at Pensacola, June 12, 1923.

ing, and these activities are carried on in a variety of climates, varying from the cold of northern stations to the intense heat of our tropical possessions, and he is expected to adjust himself to these changes and be as efficient in one place as in another. It is one of the medical officer's duties, and one of his most important ones, to guide, direct, and assist in making this adjustment and particularly in rendering the environment everything that it should be in order to conserve, preserve and maintain him at his highest efficiency.

Sanitary work is, at best, slow, plodding, and usually devoid of the spectacular. The results are also achieved slowly, often so slowly that they are accepted by the laity as a matter of fact without appreciation of what are in reality splendid accomplishments. How many of the laity know, or knowing, appreciate the fact that General Gorgas made it possible for General Goethals to build the Panama Canal, which feat would never have been accomplished without the patient, intelligent work of that eminent sanitarian?

Rigid observance of prophylactic measures has made it possible to prevent many of the diseases which have in times past been known as camp scourges. Malaria, typhus, typhoid, relapsing fever, dysentery, cholera, diphtheria, and others, no longer are the riders of the pale horses that once walked untrammelled through our camps and took their toll of stalwart, healthy men. Disease is, as we all appreciate, a far more formidable foe to our fighting forces, as well as to the wheels of industry, than the shot and shell of the most terrible of enemies. A generation ago, the economic loss to the South from the hookworm alone amounted to millions of dollars. Knowledge of the life history of this parasite, together with the discovery that thymol is a specific in eliminating it from the patient, has prevented many from becoming infected, has cured those already staggering under its ravages, and has saved the South material loss in dollars and cents.

Every naval station presents its own sanitary problems, peculiar to its locality, and a few of ours will now be presented to you. In order to render the situation clear, a short description of the station may not be amiss, as many of you are probably not familiar with its topography and the area which it covers.

The naval reservation covers an area of about fifteen hundred acres, of which the air station proper occupies only a small portion, approximately two hundred and thirty-three acres. The land is low, sandy, and covered by timber and underbrush. There are numerous small ponds and marshes which are inlets from Pensacola Bay. Much progress has been made in clearing this land of underbrush and draining the marshes in and near the reservation villages of Warrington and Woolsey, which are located just outside the main gate of the station. Approximately ten miles of drainage ditches have been dug and oil drips of five-gallon capacity have been placed in the marshes, ditches, and other strategic points. A sanitary squad of five negro laborers, under the guidance of the medical officer of the station, clear the adjacent land of undergrowth and keep the ditches clear, clean, and well oiled at all times. As a result of these and other measures, mosquitoes have been, and still are, kept down to a minimum, and in the past two years there have only been two cases of malaria that are traceable to infection at this station. These ditches also contain a large number of minnows, which, by their constant preying upon the larvæ, greatly reduce the number of adult mosquitoes.

This sanitary squad is, in our opinion, one of the most important adjuncts to the life and well-being of the station. Six days a week, year in and year out, they are hard at it, oiling ditches here, clearing underbrush there, removing debris of every kind wherever found, and reporting anything to the medical officer that may seem out of the way to them. They are all over the reservation and their reports are often of inestimable value in forestalling what might become a menace to health. Their work is so laid out that ditches and marshes are oiled once every week, which is three days less than the time required for the mosquito eggs to hatch. These men are only negroes, uneducated and illiterate, but they have the welfare of the reservation at heart, living upon it as they do and obeying orders as they are given, and I take this opportunity of commending their good work.

The villages of Warrington and Woolsey are under the sanitary supervision of the medical officer. Regular inspections are made of the premises of the citizens and special inspections when the occasion warrants. The chief drawback to these villages is the absence of a proper

sewage system. Garbage is removed in the usual way and properly disposed of at the station incinerator, but on account of lack of funds, no toilets exist and recourse is had to the use of the old-fashioned privy of rural days. However, all privies are required to be screened in the rear by a hinged door which fits snugly when closed, and all seats are furnished with tight-fitting lids, preferably of wire screening to permit free circulation of air. The receptacles for feces are of metal and are of such height as to reach no lower than two inches below the rim of the seats. Supervision is also had over all activities involving the sale of food or drink, and the premises of groceries, meat markets, soda fountains, etc., are constantly inspected. No dairyman is allowed to sell milk anywhere on the reservation until he has submitted a certificate from the state veterinarian stating the number and kind of cattle and whether each one shows a negative tuberculin test. The medical officer personally inspects all dairies (without notice being given in advance to the owners) and a first-hand knowledge of their methods of cleanliness is thus obtained. The inhabitants of these villages are vaccinated free of charge at the yard dispensary against both smallpox and typhoid fever. All births, deaths, and infectious diseases occurring among the residents are reported to the medical officer, who takes the necessary steps appropriate to the occasion.

On the station proper, the following inspections are made: Daily inspection of all food received at the commissary store; daily inspection of mess halls and galleys and all meals served; daily inspection of the brig and prisoners; weekly venereal inspection of all men connected in even the remotest way with the handling, preparation, or serving of food; weekly inspection of the welfare cafeteria and the marine post exchange; weekly inspection of the enlisted personnel and the enlisted men's barracks; monthly inspection of all buildings in the yard which house civil employes; the welfare fund maintains a pig farm on the reservation and this is inspected once a month. The hogs are vaccinated against hog cholera, the stys are clean and there is seldom any odor.

In addition to the methods already mentioned for the eradication of mosquitoes, the grounds of the entire station proper have recently been filled in and leveled off by the use of dirt removed from other parts of the reservation. This measure removed all depressions and consequently all potential breeding places for mosquitoes and at the same time released the sanitary squad from the task of oiling holes that were temporary pools after each rain, and thus their services could be used elsewhere.

The garbage of the station is removed daily from all sources, including the officers' quarters, and is disposed of in the usual way at the incinerator. The sewage system is the one familiar to you all and is quite satisfactory.

The water situation, however, is our gravest problem, and the sword of Damocles daily hangs over us. The consumption of water on the station, including the naval hospital, averages about 250,000 gallons per day. This water is filtered through the deferrization plant and is obtained from one deep well and twenty-one shallow wells. The deep well delivers approximately 150 gallons per minute, the remainder of the supply being from the shallow wells. The settling tank has a capacity of 100,000 gallons, as has also each of the two storage tanks, the latter reaching an elevation of 150 feet. One of these tanks is kept as a reserve in case of fire.

A sanitary survey of the station was made with a view to the location of new deep wells. After careful consideration, the medical officer recommended that no wells be dug for permanent use, as the grounds available are in a vicinity drained either by human habitation or the national cemetery. The wells now in use, especially the shallow ones, present just this condition, but as an offset, there is considerable filterative action, as the water percolates through sand. Test wells are being dug between the station and the city of Pensacola, but a report on same is not yet available. The potable water for the officers' quarters and the enlisted men's barracks, until January, 1922, was rain water collected from a number of buildings and stored in closed cisterns. This supply, dependent as it was upon atmospheric conditions, frequently ran low, and was considered precarious. However, until January, 1922, this was our sole source of potable water. The water from the station mains was not potable on account of the iron and sulphur content. In addition to being unpalatable, the iron was present to such an extent as to color all basins, bath-tubs, and towels.

The deferrization plant has corrected this and our tap-water is now potable. However, our real problem at present is the constancy of supply, for the one deep well and the twenty-one shallow ones may fail at any time from the corrosive action of carbonic acid gas or from other causes. In my opinion, and I have repeatedly so recommended, the best solution is in connecting up with the Pensacola mains to the eastward of Bayou Chico, thus acquiring a constant, potable supply.

The operation of the deferrization plant is as follows:

First—Aeration: This removes odors from the water by the escape of noxious gases into the atmosphere. This is accomplished by breaking up the water into small particles, so as to give the gases therein contained a chance to escape. The æration also introduces oxygen into the water. It also removes carbonic acid gas and thus reduce the amount of lime required for neutralization of the carbonic acid.

Second—Lime Treatment: The lime is added for the purpose of neutralizing the carbonic acid, forming calcium carbonate, which precipitates. Alum is also added at this stage. It is used as a coagulant and, being heavy, sinks, carrying in its meshes some of the iron, the bacteria, and other foreign matter.

Third—Iron Removal: The introduction of the lime forms a ferrous hydrate which is oxidized by the oxygen to ferric hydrate, part of which settles in the settling tank, and part of which is removed by sand filteration.

Fourth—Sand Filteration: This filters out the ferric hydrate above noted, also the bacteria.

Fifth—Chlorinization: This process is at present being installed and was deemed necessary on account of the presence at one time of colon bacilli in the raw water from the shallow wells. These colon bacilli are thought to have come either from a leak in a man-hole main in the naval hospital grounds or from a stable in the near vicinity of the shallow wells. The stable has been removed and the leak in the hospital grounds repaired and subsequent examination of the raw water from these wells has been negative. As a matter of interest, the last examination of water was made by the laboratory of the U. S. Naval Medical School in Washington and the samples were sent by aeroplane, arriving in twenty-four hours after collection.

A routine examination of water is made every quarter, both chemical and bacteriological, and oftener when the circumstances require it.

The naval enlisted man, after graduation from the rookie class, is, as a rule, fairly particular about his personal hygiene. He is, however, when on liberty, not so careful with whom he sleeps nor is he very meticulous in his selection of a bed. Consequently, it is not uncommon to find that he frequently brings some of his bed-fellows back to the barracks with him and, were it not for frequent inspections, the common bed-bug, Acanthus Lectularia, would shortly reign supreme. In order to rid the barracks of this unwelcome guest, the following routine is observed: The personnel of the infested section will remove at reveille beds, mattresses, pillows, pillow-cases, and blankets to the north and in the near vicinity of their building before going to breakfast. When beds are outside as directed above, pillow-cases and mattress covers will be removed, turned inside out, inspected for vermin and well shaken out, and if so directed, they will be sent to the laundry. If not so directed, they will be returned to the building and stowed in lockers for use that night. Immediately after breakfast, a detail of two men from each division will report to the chief master-at-arms, who will supervise the following procedure: Steam all mattresses and pillows, followed by spraying with a solution of equal parts of kerosene and gasoline, followed by a thorough brushing with a hand kiyi, after which they will be laid out flat on racks for sunning. Blankets will be treated likewise and hung on clothes-lines provided for this purpose and exposed to the sun's rays. In the matter of steaming mattresses and pillows, care is taken not to allow them to become too thoroughly soaked. Bunks will then be folded so as to expose all possible cracks and a thorough application of steam administered through a steam hose, paying particular attention to getting steam in all corners and cracks. After this, spray thoroughly with the kerosene-gasoline mixture and replace in a normal position again and leave outside. At 2 p. m., this working party will reverse the sides of the mattresses and pillows and blankets in order to sun the opposite sides. No bedding is returned to the barracks until 4

p. m. While bedding is outside, compartment cleaners spray all parts of the building where vermin may lodge, particular attention being given to cracks in the wainscoting, lockers, etc. The airing of bedding is a routine weekly procedure and if any vermin are found, the above measures are carried out.

Sanitary drinking fountains of the bubbling spring variety have been installed in all buildings where sufficient workmen or enlisted men are employed to justify it. In offices, the individual paper cups are used. At one time, quite an epidemic of gingivitis of a Vincent's angina etiology appeared and its origin was traced to the use of a community drinking cup. This epidemic disappeared with appropriate treatment and the installation of fountains as described above. Incidentally, the gingivitis was very successfully handled by Lieutenants Whitmore of the Medical Corps and Daniels of the Dental Corps, and the form of treatment used was local applications of carbol-fuchsin.

A constant warfare is waged on roaches, Some of the officers' quarters have been so-called "roach-proofed," which consists merely of closing up cracks and holes and is not entirely successful. The constant use of sodium fluoride seems to keep them down to a minimum, but does not entirely eradicate them. All cooks, mess attendants, etc., are instructed to keep all food in hermetically sealed containers and allow no crumbs or scraps of food to lie around, but this measure is not strictly carried out and it is very difficult to rigidly enforce it.

Fly-traps are placed outside galleys (kitchens) and in the rear of each officer's quarters. Garbage is placed in metal receptacles with close-fitting tops and stored in screened houses until time of daily removal. Rat-traps are also to be found all over the station. Those of us who indulge in poultry raising have our poultry houses with concrete floors and they are cleaned out twice a week and clean sand spread on them. Water troughs are emptied daily and the houses are given an inside coat of white-wash once a month.

A recapitulation shows the following measures are being taken for the eradication of mosquitoes:

Cleaning, clearing, and oiling of ditches; the use of the top minnow, lebistes reticulatus or guppy, in the ditches; clearing of undergrowth on the station, at Camps Mustin and Bennett, at Commodore Pond, and the two cemeteries; grading and leveling of the station grounds, thereby eliminating temporary or permanent pools; keeping the lawn grass cut short; no open receptacles capable of holding water, as cans, etc.; screening of all buildings and living quarters; all flower-pots shall have holes in the bottom to drain off excess water; discouraging the growing of elephant ears, and the oiling of the stem canals of same after a rain; all cisterns to be either closed, or else screened with wire mesh at least eighteen wires to the inch each way; emptying of chicken troughs daily. No one in Warrington or Woolsey shall have, keep, maintain or permit any cistern, tank, barrel, or other receptacle of similar character, containing water in which mosquito larvæ may develop unless the same shall be screened with wire mesh of at least eighteen wires to the inch each way, or otherwise covered so as to prevent the ingress and egress of mosquitoes to and from the water therein contained, or failing these measures, the receptacle must be emptied daily; in cisterns or tanks where larvæ are found despite the use of screens, the introduction of the guppy is excellent, if the entry of light is sufficient to sustain life—if not, the owner has the alternative of using oil every week. A thin film of oil does no harm to the guppy so far as we have been able to ascertain. When larvæ are discovered in a receptacle containing water, there is considerable objection to the use of oil on the part of the householder, if the water is to be used for drinking or cooking, but as the water is usually withdrawn from a hole or faucet low down, there is no mixture of oil and water, due to the oil floating on top.

"An efficient larvacide has been found in Paris green in the proportion of one per cent mixed with ordinary road dust and thrown by hand over breeding areas, the operator standing to windward and relying upon the breeze to spread the mixture. Two teaspoonfuls of Paris green mixed with twenty-five ounces of road dust will control one thousand square feet of breeding surface at a cost of one cent. The application should be repeated at intervals of ten days and the operator should wear gloves. The mixture is harmless to vegetation and does not poison cattle." It has not been tried by us yet, but will be in the near future.

THE PROFESSIONAL ETHICAL BUSINESS RELATION OF PHYSICIAN AND SURGEON.

R. R. KIME, M. D., F. A. C. S.,
Orlando, Fla.

After many years of professional service and work varied from that of a country practitioner to town and city work, both in general medicine and surgery, with the vicissitudes and struggle incident to these various phases of professional life, I yet have confidence in medical ethics and the high calling of the medical profession.

Ethics is defined as (a) "The science of human duty," (b) "The basic principles of right actions."

Every honorable business man should be governed by such principles and actions, and especially a member of the medical profession in dealing with human lives. The profession of medicine is second to none, unless it be the ministry, in opportunities for doing good, relieving suffering, and aiding in the uplift of humanity. Doing our duty as a profession calls for that which is noblest and best in us.

The profession of medicine has passed through many transititional periods from the dawn of its history up to the present.

"The advance in scientific medicine has been greater during the lifetime of some men now living than in all the history of the world before." —Keen.

We as a profession are participating in the world changes that are now taking place, and vital, potent forces are working for better conditions. We are passing from a period of personal gain and commercialism into a broader field of closer relations and unity of action in the preservation and development of the human race.

Some of us can remember the day of the "old-time family doctor," revered in the home next to that of the minister, sacrificing and ministering, day and night, to suffering humanity with or without compensation. God's noblemen they were. They were supplanted by the age of specialization and commercialization of the medical profession. A two- or three-years course in medicine and a few weeks in special study developed a full-fledged specialist ready to pocket the silver and the gold. Medical ethics to many of these was old fogy, out of date and out of style.

The medical profession is just beginning to realize the world vision—the Rotarian vision, if you please—"Service to Humanity." "He serves best who serves most."

The future will develop a closer, more cordial and more beneficial relation as regards patient, physician and surgeon. The physician will become more proficient in diagnosis, call in or refer patient to surgeon earlier, when efficient, better surgical work can be done. The surgeon of the future will be better qualified and better trained for more efficient, complete, constructive surgical work.

The efforts being put forth in the last few years in raising the standard of medical education will give us better trained and better qualified physicians. It will also give better ground foundation for qualified surgeons.

Add to this the effort of the American College of Surgeons to standardize surgery; also both the work of the American College of Surgeons and the American Medical Association to standardize the hospitals, and the future gives bright prospects for more efficient medical and surgical work, and more unity of action between physician and surgeon.

Need I say that prompt early diagnosis is often imperative on the part of the physician for the best interest of the patient. Take, for instance, acute appendicitis, intestinal obstruction, ulcer with perforation, perforation of stomach or duodenum, or perforations in typhoid fever; strangulation of hernia; free intraperitoneal hemorrhage in ectopic pregnancy; in all, delay in diagnosis is dangerous. Delay frequently means complications and death. Here the physician has a duty and responsibility which he can not evade. Early diagnosis and early operation in each is comparatively safe, late operations often extremely dangerous.

The physician should be very efficient in the diagnosis of such conditions; if not, he should at least call in a surgeon early. If the physician delays and the surgeon is required to do a late operation in an effort to save life of patient, then the surgeon is not responsible for death of patient if he does good surgery under the circumstances. If a physician is in doubt as to acute appendicitis or intestinal obstruction, he should call a surgeon at once and not kill his patient by delay and giving cathartics.

The only thing admissible in the line of cathartics in acute appendicitis is large doses of

olive oil early, or an enema of oil and boric acid solution early, one or both in the first few hours of the attack; washing out stomach is advisable if full of food or if vomiting; none of these should be used in perforations, strangulations and in free intraperitoneal hemorrhage. The physician that delays calling a surgeon and gives drastic cathartics in these cases is responsible for the results, which is death frequently if active cathartics are given.

In many other instances there are border-line conditions that need the combined knowledge, with cooperation and harmony, of physician, surgeon and laboratory worker for best interest of patient. Discord and criticism render each less efficient, causes the public to lose confidence and the patient to lose faith, which is often an important factor in successful medical and surgical work. Equally reprehensible is the unjust criticism of the physician's treatment of the case by the surgeon.

Financial returns frequently are a bone of contention between physician and surgeon and does much to discredit the profession of medicine and surgery. Here we have a Golden Rule and an ideal guide: "Treat and charge each patient as you would like to be treated and charged if in their place." This requires frankness, strict honesty of purpose and square dealing on the part of both physician and surgeon. He who charges more than his services are worth or for services not rendered is a "profiteer," be he physician, surgeon, or laborer. "The servant is worthy of his hire," is also equally true. No physician or surgeon should charge for services not rendered. You would think so if you were the patient. Exorbitant fees on the part of the surgeon is profiteering just as much so as exorbitant charges of the merchant or laborer.

Much that seems exorbitant in the charges of the surgeon is not exhorbitant. The surgeon's fee usually includes the examination of patient, consultation with physician in charge, the operation, assistant, and after-treatment with care and attention while in hospital, often advice and counsel with physician afterward.

A surgical operation in proportion to its magnitude carries with it a great weight and responsibility to the conscientious surgeon, and none other is worthy of the support of the physician. If the case is a prominent business man handling large interests, a prominent official, or a prominent professional man, the responsibility of the surgeon is greater and, in case of death, injury to surgeon's reputation is often greater; hence, the compensation should be greater. It is also evident the physician treating such persons assumes more responsibility and should charge in proportion to time consumed and responsibility. Special investigations and examinations should also have their compensation to the physician in charge.

Physicians and the public often overlook the fact that a surgeon's fee includes the visits, time and attention given patient after operation. Frequently the surgeon makes so many visits in the after-treatment and attention to patient, often having very unpleasant work in changing dressings, that if charged for at regular rates there would be but little if any money left to pay for operation proper.

It costs much to be a well-qualified surgeon, as he must first be a physician, then acquire additional qualifications to fit him for surgical work. It requires a larger outlay for surgical instruments and equipment, with hospital accommodations for efficient work surgically, also to group his cases to save time visiting each individually, to supply them with trained surgical nursing, trained operating-room nurse and a trained assistant. The surgeon gets a case from a family once or twice in a decade, while the physician has their work year after year.

In the near future all surgeons will have to be better educated, better fitted and trained before doing surgical work. As it has been, and is even yet to some extent, many enter the field of surgery, making the competition great, and in the struggle for survival the profession is commercialized by some, and in many places the professional standard is lowered, so that surgeons give commissions, division of fees either directly or indirectly to physician sending him patients. Having the physician bringing the case, except in cases of emergency, to help in the operation is only a subterfuge for the same purpose. Every surgeon should have a regular competent assistant if he does justice to his patient. With irregular assistants, no surgeon can do as rapid, efficient surgery and will have more infections and complications following his work. An occasional assistant is not a good assistant, an occasional operator is not a good operator. If you were on the operating table what would you expect?

The anesthetist should be competent and specially trained for the work so as to lessen risk to the patient and relieve the operator of responsibility during the operation. The surgeon using the physician bringing him the case, as anesthetist or assistant, changing each operation, is not a safe surgeon, can not do his patient justice and will have more infections and complications following his work. In cases of emergency or work in the country such things have to be done, but should not be done in regular hospital work.

There should be a close relation between the physician and surgeon, they should consult oftener, giving each other the benefit of their experience. The physician should see the results of his diagnosis in the operating room more frequently; it would make him a better diagnostician and a better physician.

A physician should select a surgeon to do operation on account of his fitness, qualifications and ability, not only of himself but also his anesthetist and assistants, and not from the amount of the commission or money he is to get out of the case. Such money carries with it a curse to both giver and receiver, and is a disgrace to the physician, surgeon and the medical profession. Men that do such things do not merit the confidence of the public.

Giving commissions in any form is simply selling your patient to the highest bidder. Suppose the trusted family physician, because he can get a larger "rake-off," sends his trusting patient to a surgeon not so competent to do the work and the patient dies because of that lack of ability, then who is responsible for the death of the patient? Who has betrayed a trust? Suppose you were a layman and the patient a loved one of your own family. What would you think, say and do?

The fee-splitter and commission-giver are parasites sapping and destroying confidence in the medical profession, and should not be recognized by honorable members of the profession nor allowed on the staff of a recognized hospital.

Can you be honest, sincere and true to your profession, yourself and to your patient and participate in such methods of professional work?

If the surgeon charges a big fee in order to give the physician a commission, then the patient lionizes the surgeon as a wonderful man doing wonderful work, and at the same time minimizes the services of the physician and considers them of little value.

If the physician goes with patient to see the surgeon and holds a consultation, giving surgeon information of value and is present at the operation, he should present his bill to the patient, not the surgeon, for his visits, consultation and time. Then the patient will recognize the services of his physician as being something of value and, being able to consult with the surgeon, will increase his faith in you and your ability.

The surgeon should charge a reasonable fee for his services and responsibility, render his own bill to the patient and maintain you in charging a reasonable fee for your services rendered the patient.

Such action on the part of the surgeon and physician impresses the patient with the value of the services of each. The patient realizes he has had a square deal, has greater confidence in the medical profession and more faith in his family physician.

Any surgeon that splits fees, or gives commissions either directly or indirectly, lowers himself in his own estimation, the physician receiving them feels the same influence, both are more or less suspicious of each other, and lose confidence in the high standard and ethical relations of the medical profession.

If the patient could adjust a mental X-ray and read the transaction, would it increase his faith and confidence in the surgeon, his physician and the medical profession? If you do not want the patient to know of the transaction, it is self-evident then that it is wrong.

Can you imagine Jenner, Hunter, Lister, Pasteur, Gorgas, Sims, McDowell or Osler doing such business? Then can we afford to be less honorable and loyal to our profession?

If we, as a profession, condone and endorse giving commissions or splitting fees by the surgeon, when and where will it stop?

Soon all the specialists would have to give commissions to get business. Even the general practitioner when he attains a big reputation would have to give commissions to get consultation work, or patients referred to him. The X-ray and laboratory worker would have to fall in line and give commissions. In places, I have known of physicians getting rebates on prescrip-

tions. If the almighty dollar is what we are after, regardless of the honor of our profession, why not make the undertaker give us commissions, as the one that gives commissions will have more use for the undertaker—hence, make more money.

Will you, as an individual member of the profession, help to lower its standards by auctioning off your patient to the highest bidder for a few dollars and cents, at the sacrifice of principle, and possibly be responsible for the death of your patient?

Such practices are forbidden by laws in Kansas, Nebraska, Iowa, Minnesota, Wisconsin, Ohio, Alabama, West Virginia, Tennessee and Colorado.

Any physician doing such business, if known, is not admitted to the American College of Surgeons and gives a written obligation not to do so before admission. I quote from Transactions of 1920, page 24: "I hereby promise, upon my honor as a gentleman, that I will not so long as I am a Fellow of the American College of Surgeons, practice division of fees in any form; neither by collecting fees for others referring patients to me; nor by permitting them to collect my fees for me; nor will I make joint fees with physicians or surgeons referring patients to me for operation or consultation; neither will I in any way, directly or indirectly, compensate any one referring patients to me; nor will I utilize any man as an assistant as subterfuge for this purpose."

No surgeon can attend the clinics of the American Clinical Congress of Surgeons until he has signed a statement that he does not give commissions or split fees in any form.

Some of the best hospitals do not now admit anyone on the staff that does such work. Soon a majority of the hospitals will be standardized and not permit such practices by members of the staff.

To me the high calling, honor and dignity of my profession comes first, and before I will lower the dignity and honor of my profession or trail its banner in the dust and slime of dishonor, I will leave the profession and pursue some other business or profession in which I can make an honorable, honest living.

In conclusion, I desire to again emphasize what I consider the Golden Medical Creed: *"Treat and charge each patient as you would like to be treated and charged if in their place."*

With this as a guiding principle in professional life, one can not go far astray. If you aspire to a higher, broader, professional life—"Believe in yourself, believe in humanity, believe in medical ethics, believe in the success of your undertakings. Fear nothing and no man. Love your work, love your profession. Work, hope, trust and be true. Keep in touch with today, teach yourself to be practical and up-to-date. You can not fail."

CORRESPONDENCE

In a recent issue of this Journal I outlined in a very brief and incomplete article some of the policies of the Southern Medical Association; why such an organization was necessary, what it stands for and is accomplishing, showing the percentage of members of the Florida Medical Association holding membership in the Southern.

Since this article appeared, many letters and application blanks have been sent to our members inviting them to affiliate with the Southern Medical Association. In response to these letters and the presence and effort of a representative of the Southern Medical Association at our annual meeting in May, at Jacksonville, the membership in the Southern from Florida was materially increased, for which I am duly thankful and appreciatively grateful.

This great and wonderfully progressive regional association will hold its annual meeting at Washington, D. C., November 12 to 16, 1923, and from a superficial survey of the tentative program it promises to be the best and largest attended of any preceding assembly.

The national capital offers many and divers interests and attractions to the visitor, of which he never tires, and in November especially is the climate salubrious. Special railroad rates are offered for the meeting and a certificate of indentification from the Southern Medical Association entitles one to purchase a round-trip ticket for one and one-half fare from the local railroad agent.

If you are not a member of the Southern Medical Association, apply at once for membership blank and certificate and sound the slogan in your community, "On to Washington".

(Signed) R. H. McGinnis, M. D.

DETAILED REPORT OF TREATMENT OF A CASE OF LOCK-JAW WITH RECOVERY.*

J. S. TURBERVILLE, M. D.,
Century, Fla.

The purpose in view in reporting this case is the hope that others will do likewise and we will thus be able to arrive at some approximate idea of the amount and method of using antitoxin.

H. B., age 13, white American. Past history: Measles at 9 years, whooping cough at 8 years, influenza 1923, gun-shot wound right leg February 27th, right fibular region. No prophylactic given. On the eleventh day after gun-shot wound patient showed slight stiffness of jaws, followed a day later by convulsions at about two-hour intervals. Admitted to hospital March 13th, convulsions severe and frequent, temperature 102, pulse 140.

Physical examination: Heart and lungs O. K., muscles of neck and jaw stiff, mouth could be only partially opened. Abdominal muscles in a state of contraction, opisthotonus well marked. Gun-shot wound right fibular region, right foot and toes extended. Urine negative both chemically and microscopically. Patient anæsthetised, March 13th: 4,500 units antitoxin intramuscularly, 3,000 intravenously, and 2,500 intraspinally.

March 14th: Convulsions frequent and severe. Under anesthesia — 5,000 units administered intraspinally, 10,000 intravenously, and 10,000 intramuscularly.

March 15th: 5,000 intraspinally, 10,000 intravenously. Convulsions less severe and frequent. Gun-shot wound dressed with permanganate solution, later saturated with iodine and glycerine. Wound cleaned up and all unhealthy tissues cut away.

March 16th: Patient restless, light convulsions throughout day, 5,000 intraspinally, 10,000 intravenously, 5,000 intramuscularly.

March 17th: 10,000 intraspinally, 10,000 intravenously.

March 18th: 10,000 intramuscularly, 10,000 intravenously.

March 19th: 10,000 intravenously, 10,000 intraspinally, 5,000 intramuscularly in region of sciatic nerves.

March 20th: 20,000 intravenously.

March 21st: 15,000 intravenously.

March 22nd: Patient resting much better, no convulsions, 25,000 intravenously.

March 23rd: 20,000 intravenously.

March 24th: 20,000 intravenously.

March 25th: 20,000 intravenously. General condition much improved. Rigidity less marked in muscles of abdomen and neck. Patient up in rolling chair.

March 26th: No antitoxin administered during day, slight biting of tongue during night.

March 27th: 20,000 intravenously.

March 30th: 20,000 intravenously.

April 1st: 15,000 intravenously.

Liquids and semisolid diet given freely until patient was able to masticate regular diet. Patient discharged from hospital on April 2nd.

Morphine and chloral were given freely to prevent the patient from wearing himself out during the period of detoxication. We gradually withdrew these drugs and by the end of a week he was only taking a dose at night. We used chloroform to begin the anæsthesia, and then followed this with ether. This was given on five successive days and an interval of one day was allowed, and then the final anæsthesia was given on the seventh day. It was thought that these short anæsthesias would be less harmful than the pain and mental anguish caused by bending the body forward to do a spinal puncture.

You will observe that 310,000 units were used altogether.

I wish to take this opportunity of thanking my associate, Dr. N. L. Gachet, for his labor in working up the details of this report from the hospital record.

*Read by title at the fourth annual meeting of The Florida Railway Surgeons' Association, held at Jacksonville, May 14, 1923.

AVIATION MEDICINE.*

LIEUTENANT J. R. POPPEN,
Medical Corps, United States Navy.

The impetus given aviation during the late war is too well known to need reiteration at this time. It is only necessary to mention it to remind us of the tremendous strides made in the construction and maintenance of aircraft. Nor has this advance stopped with the signing of the armistice. Methods of construction are continuously being improved and records for sustained flight, speed

*Read before the Escambia County Medical Society, at Pensacola, June 12, 1923.

and maneuverability are broken almost daily. Aviation today is experiencing more advancement than perhaps any other science. The conquest of the air is no longer an hypothetical problem but an accomplished fact. Man flies.

Throughout the history of man we can point with pride to the fact that our profession has kept pace with advancement in all fields in which new medical problems opened up. When the war called for large numbers of men for aviation duties, the profession was immediately faced with the problem of determining who should be trained for this work. What were the peculiar qualifications of a good aviator? That he should be free from all physical defects was easily apparent. True, it was not as well known then as now just how important even slight temporary physical derangement might be, but we knew that they must be the most fit. Well, what were the safe limits? Was 15/20 vision sufficient? Was it necessary that a candidate hear perfectly? All these questions came up. The Surgeon General of the Army, confronted with this problem, approached it with the same despatch and diligence which characterized all the war work in this country. A commission was appointed consisting of army medical personnel and civilian physicians particularly qualified in their several specialties, which was charged with the determination of what constituted the standards which should be maintained in the acceptance of men for aviation duty. The results of their efforts are a page in medical history of which this country may justly be proud. It is interesting to note that the standards outlined by this commission, practically unchanged, are standard even now.

It soon became apparent that medical personnel must be especially trained in the examination of applicants for flying training and the care of the finished flyer and so there was created the Medical Research Laboratory and School for Flight Surgeons. As the School of Aviation Medicine at Mitchel Field this organization remains as the training school for both army and navy flight surgeons. In addition to this instruction, experimental work is in constant progress tending toward the improvement of examination methods and care of aviation personnel.

Aviation medicine embraces the determination of who shall be accepted for aviation training, who shall be continued on duty involving flying, the detection of physical and psychological defects which should either temporarily or permanently ground a flyer and the avoidance and correction of these defects in order to preserve the highest efficiency in aviation activities. Study of the psychological adaptation to altitude, wind, cold, equilibrium, etc., may be mentioned as fields of research opened to science with the advent of aviation.

The examination of candidates for aviation training is a most comprehensive one. It can be safely said that it is the most rigid of all physical standards. That this is necessary is apparent when it is remembered that statistics prove that during the war 8 per cent of fatal crashes were caused by mechanical defects in the planes, 2 per cent caused by the enemy and 90 per cent by either temporary or permanent physical defects of pilots. The reduction of this avoidable 90 per cent is the big problem of aviation medicine. Not only is the candidate given a most careful general physical examination, but particular stress is laid on the examination of the special senses, particularly the eye and ear. The eye examination includes not only visual acuity, but a determination of depth perception, complete phorometry, strength of accommodation, color sense, field of vision for form and color, refraction under homatropine and a careful ophthalmoscopic examination. The ear examination includes careful history, appearance of the external canal and the tympanum and the determination of auditory acuity by means of the watch tick and coin click as well as the patency of the eustachian canal. Next follows tests of equilibrium on the Barany chair, which determines the patency and sensitiveness of the semicircular canals and associated nervous mechanism particularly in regard to time or horizontal nystagmus, past pointing on stimulation of the horizontal canals and falling from the erect posture after circulating the fluids in the vertical canals. After a careful medical history is taken the candidate is given a minute physical examination with a view to determine the presence of any defect which would make him susceptible to the rigors of so unnatural, inhuman environment as the air. This phase of the examination stresses the efficiency of the circulatory organs, including careful examination of the

heart to determine the presence of any organic lesion, blood-pressure readings and the circulatory efficiency rating or Schneider index. The last is a numerical expression of the reaction of the heart to postural changes and standard exercise as shown in the change in pulse rate and blood pressure.

It is an accurate index of a man's general well-being and is sensitive to even casual temporary changes such as the loss of a few hours' sleep or dietary indiscretions, etc.

Examination is completed by a very careful neuropsychiatric history and examination. The scope of this short paper will not permit a detailed discussion of this phase of the examination. Suffice to say that if we are careful and rigid in the physical qualifications of the candidates we are even more so in regard to their psychological qualifications. Aviation is the one branch of the service which calls for individual effort more than any other. There is practically no "mass action" in aviation. The flyer feels himself entirely "on his own" while he is performing his duties. We cannot condone slight variations from the normal reactions as we can in the case of organizations in which comrades may bolster one of their number along. The adjustment to the environment of flying calls for the highest type and most acutely developed psychologic reactions. The character elements which go to make up the desirable personality for flying duty are a study in themselves and must be left to the other writings for more detailed description.

The keynote in the examination is "reserve". It is not sufficient that a man have binocular fixation. Does he maintain fixation at the expense of strain on a certain muscle or group of muscles? Has he perfect muscular balance? It is not sufficient that he have normal vision, 20/20. Does he exhaust his entire reserve of accommodation to do so? Or is his true correction under cycloplegia small enough to leave him a reserve of accommodative power? It is not sufficient that he be able under the most favorable circumstances to pilot a plane around Pensacola Bay. In time of war, under the strain of hard, strenuous flying, in unfavorable weather, following a siege of influenza, or perhaps an acute sinusitis, can he still maintain normal vision? We are not so much interested in the fact that he has no murmurs, irregularities of abnormal pulse rate, important as these unquestionably are, as we are in his efficiency rating. Does his heart react to postural changes and exercise in such a way that it indicates a degree of reserve sufficient for him to stand up under severe strain? It is not sufficient that he be free from demonstrable psychosis. Is his mental equilibrium such that when his wife and baby are sick at home, he has just received the news of the death of his mother or he has just seen his dearest friend fall in a fatal crash, he can climb into the cockpit and "give 'er the gun?"

Not the least interesting phase of our work is the rebreather. This is an instrument by which we can measure an individual's capacity to withstand oxygen want. Most of the symptoms caused by high altitudes are the result of the reduced partial pressure of oxygen, producing a condition of anoxic anoxemia. All individuals differ in their ability to withstand reduced oxygen pressure, the conditions on which this difference is predicated remaining still in obscurity. Without subjecting him to actual reduction of oxygen, it is impossible to determine his reaction. The rebreather accomplishes this by reducing the percentage of oxygen while at high altitudes the percentage remains normal but, atmospheric pressure being reduced, the partial pressure is less. The effect is the same. So by gradually reducing the percentage of oxygen in a mixture under normal sea-level pressure we stimulate climbing to a high altitude.

The apparatus, briefly described, is a tank from which the examinee breathes air through closed tubes. He exhales through a carton of sodium hydroxide crystals, removing the carbon dioxide, back into the same tank. The only change in the air is a gradual reduction in the percentage of oxygen present. During the course of the experiment careful record is made of rate and amplitude of respiration, pulse rate, and blood pressure. An intricate electrical devise which affords him a threefold problem is constantly in operation and his performance is noted particularly in regard to his attention and motor coordination which are the two mental functions most affected by oxygen want. As the oxygen percentage becomes less and less, inefficiency

will be shown in a variety of ways, depending on the type of reaction of the subject. He may experience circulatory inefficiency as shown by sudden drop in pulse rate and blood pressure, fainting, or he may become inefficient in the performance of his mental task. Rarely he may exhibit psychotic tendencies which, of course, immediately disqualifies him. Absolutely no ill effects are experienced after the run and we are afforded an excellent record of his reaction to oxygen want. The type of reaction he shows is as much of importance as the altitude he has attained as shown by analysis of the sample of air remaining in the tank. The way he stands up under oxygen want is an accurate index of his reaction to any strain, thus affording us information as to his ability to adjust himself to flying.

The care of the flyers is one of the most important duties of the flight surgeon. I will leave out of this paper any discussion of physical training, exercise, diet regulation, etc., and will simply mention some of the things for which we must be constantly on the watch. Flyers get stale. Staleness may be shown by a number of symptoms. It always begins insidiously and is not realized by the man himself. Loss of weight, loss of appetite, listlessness, insomnia, palpitation, sensitiveness to minor inconveniences, etc., may be the beginning of a general let-down in the physical and mental tautness so necessary to the flyer. Neuro-circulatory-asthenia, variously known as "soldier heart", effort syndroms, etc., a condition in which the respiratory and circulatory response to exercise is exaggerated without apparent pathological cause, is an ailment to which flyers are especially subject. Nipped in the bud and removed by the judicious prescription of rest, systematic exercise and dietary regulations, these symptoms can be averted and staleness and a possible crash prevented.

A flight surgeon must know the life of the flyer. He must appreciate the hazards of flying. He must undergo the same trials, the same thrills, the same sense of the ever-presence of the old man with the scythe. He must know these to appreciate the needs of the people whose health and well-being are in his hand. There is nothing so stimulating to cooperation on the part of the flyer as the realization that the medico is ready to undergo the same things he does with the same confidence as he would come to the medico to have his appendix out. We must have the confidence of the flyers in all walks of their lives. They must feel that they can confide in us their most personal trials, knowing that our desire is to keep them in the air and out of the hospital. We do not pose as wet-nurses, nor as shields behind which to avoid duty, but the proper care of the flyer cannot be accomplished without a thorough knowledge of what he is up against and a desire to alleviate those things which make it dangerous for him to fly.

Why is it necessary for the flight surgeon to fly? That is a question often asked. If it is possible to determine beforehand by means of our methods of examination, personality study, rebreather runs, etc., what a man's reaction is going to be, is any further observation under actual conditions necessary? In other words, if we presume to be able to tell if a man is going to be adaptable to flying duty, is it necessary to check our findings by first-hand observation of his flying? An affirmitive answer must be apparent. By psychometric tests we can determine a child's mental age, but that does not constitute an examination in algebra or geometry. We can tell if he has mental horse-power enough to accumulate the desired information, but we must examine him in the subjects he has studied to determine whether or not he has gained the information. In the same way, by pelvimetry we can determine whether or not a woman's pelvis is of sufficient size and proper proportions to permit labor, but the final test must be actual labor. The same thing applies in the examination of the flyer. By approximate methods we can predict quite accurately if he is the type to warrant training, but unless we observe his flying we cannot determine whether or not he has deserved our endorsement. Indeed, observations of the different types of personality under actual flying conditions must be the source of our criteria. Again, having determined by actual observation the flying ability of our pilots, we can note those slight changes which are often the first signs of slight physical and mental derangements which usher in conditions which make it unsafe for him to continue flying and which should be watched and corrected if they reach sufficient importance to

ground him either temporarily or permanently. Observation and study of the flyers under flying conditions must be our final methods of determining the condition of our charges.

Should the flight surgeon be a finished, qualified pilot? Opinions have not centered on this question. It is generally accepted that he should know enough about it to understand the mechanical operation of the planes and to realize the hazards and dangers and the proper methods of avoiding and correcting dangerous position so that he may know whether or not the pilot is flying properly. This knowledge can be gained without requiring the flight surgeon to qualify as a solo pilot, but it cannot be gained without study and instruction in actual flying methods.

The physiological reaction to high altitudes constitutes a field of study which has only just been scratched. The increased demand for oxygen causes an increase in respiration in excess of that caused by the usual stimulation of the center by increasing the H-ion concentration. Consequently carbon dioxide is washed out of the alveoli causing a change in the acid-base equilibrium which must be met by an adjustment in the relative amount of ammonia and urea produced by the liver and an increased excretion of alkali. The mountaineer makes these adjustments by methods which extend over a considerable period of time, but the aviator must make a temporary adjustment to be followed by a more permanent one after his return to the ground. The scope of this short paper will only permit the mention of this as one of the many peculiar problems confronting the profession with the development of aviation. The circulatory changes: heart rate, blood pressure, blood cell distribution and changes in differential count; changes in visual acuity and hearing; changes in attention and motor coordination and other physic functions are among those still to be investigated. The effects of cold, wind, rapid changes in position, have scarcely been touched.

An attempt has been made to briefly outline the peculiar problems opened to the profession by the development of aviation and also the steps that have already been taken to solve them. Boring details have been avoided as far as possible, and it is hoped that this short paper has impressed you with the reasons why aviation medicine has developed as a special branch of our profession as well as the need for further study and experimentation.

CONGENITAL CLUBFEET*

J. KNOX SIMPSON, M. D.,

Jacksonville, Fla.

Talipes equino varus may be either congenital or acquired, but the congenital type is the one furnishing the topic for this paper. It is far and away the most important of the congenital foot deformities, constituting 77 per cent of the clubfoot deformities of infants, and occurring about once in each 1,000 births. It is unilateral in 57 per cent and bilateral in 43 per cent.

Concerning the etiology of this deformity we know no more than we do about congenital deformities in general, which is very little. About 5 per cent of the cases show sufficient evidence of similar defects in the family history to be classed as hereditary. In some cases it is a part of a number of developmental defects such as harelip, cleft palate, spina-bifida, etc., and can be regarded as of fetal origin. At other times pressure effects from maternal origin are evident, but the majority of the cases by far leave us with no explanation for their occurrence. Etiology, therefore, as you see, is of only didactic interest, so we will pass to the more practical considerations of the subject.

The pathologic anatomy of these deformities is extremely important, for without a thorough understanding of this phase of the subject our treatment must necessarily be illogical and fraught with many disappointments in the results we obtain.

This is a composite deformity, consisting of three distinct parts, as follows:

Inversion of the whole foot; adduction of the forefoot; and plantar flexion. Primarily, except where real congenital bony malformation is present, a relatively rare condition, malformation of the bones is entirely secondary to, and the result of, continued maintenance of a distorted position of the foot during bone growth. It is what one would expect to follow, just as surely as does the bound foot of the Chinese woman conform in its growth to the size and shape of the binding; and the growing gourd of the little country boy to the size and shape of the bottle which is placed over it. In view of the extreme importance of an accurate knowledge of the anatomy of each of the

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*Read before the Fiftieth Annual Meeting of the Florida Medical Association, held at Jacksonville, May 15, 16, 1923.

composite parts of the deformity, a brief analysis of each might be of interest at this point.

1. In the inversion the os calcis is tilted inward so that its inner tuberosity approaches the internal maleolus, and lies almost directly under the astragalus instead of to its outer side. It is held in this position principally by two agents, the internal lateral or deltoid ligament, and the pull of the tendo-achilles, which becomes with this deformity an active inverter of the foot, due to the throwing out of line of its normal pull.

2. Adduction of the forefoot accompanies a lengthening of and twisting inward of the head and neck of the astragalus, carrying the scaphoid and forefoot with it. There accompanies this part of the deformity, as a rule, a fan-like spreading of the phalanges.

3. Plantar flexion is maintained by shortening of the tendo-achilles, tilting the tuberosity of the oscalcis upward, and the astragalus forward and downward; and by shortening of the plantar fascia, maintaining plantar flexion of the forefoot. In this part of the deformity the anterior part of the articular surface of the astragalus, having been for some time free from the compressing incident to its normal position between the maleoli, becomes widened and offers an additional obstacle to correction.

Occasional additional features of the disability as a whole are internal rotation of the tibia, and knockknee, the latter frequently caused by stretching of the ligaments of the knee joint during manipulation of the foot with the knee in extension.

The diagnosis of the deformity under discussion is perfectly apparent, inspection revealing a foot which is plantar flexed, inverted, adducted, the heel small and elevated, and the forefoot broadened. Manipulation without force fails to place the foot in the normal position. The deformity may be of any grade of severity from a very mild one to one in which the soles of the feet face upward and backward, the child walking on the dorsum of the feet.

This brings us to the consideration of the treatment of these very deforming disabilities. If I should attempt to epitomize the treatment of congenital clubfeet, I should say:

Begin early, and secure and maintain overcorrection of the deformity by the simplest effective means.

To amplify a bit:

The overcorrection, namely, placing of the foot in the opposite deformity of marked eversion, abduction, and dorsal flexation, can be much more easily and effectively accomplished during the first few weeks of life, while the skeleton of the tarsus is still largely cartillagenous, and the soft parts pliable, than after ossification has taken place producing an actual bony deformity, the contracted ligaments and muscles structurally shortened, and the overstretched ones less capable of contracting and maintaining correction. It is absolutely necessary, if the outcome is to be successful, to obtain marked overcorrection of each of the three component parts of the deformity Plantar flexion must be converted into dorsal flexion; inversion into eversion; adduction of the forefoot into abduction. The use of braces or apparatus of any kind is entirely useless unless this overcorrection has been obtained, and they are used for maintaining the foot in the corrected position. When the correction *has* been obtained, the simplest appliance which will maintain it is the one of choice. Personally, I am rather partial to the adhesive dressing, though I use others at times.

Overcorrection is practically always possible by manipulation, either manual or with a clubfoot wrench, in the infant; and I believe operations, other than an occasional tenotomy, are rarely indicated in these cases. Certainly no operation accompanied by removal of any part of the tarsus should be done. Older children, those whose deformities have gone uncorrected in the unfounded belief that they would "outgrow" the deformity, more frequently require a plastic operation on the tarsus for their correction.

I do not feel that it would be interesting to you to go into detail concerning the many operative procedures which have been devised to correct cases of long-standing clubfoot deformities. They are all necessary at times, unfortunately, because of neglect of the disability in the first few weeks or months of life, but none of them can compare in their possibility of producing a normal foot, with manipulative correction, in the newborn babe.

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WASHINGTON MEETING OF THE SOUTHERN MEDICAL ASSOCIATION.

The Southern Medical Association will hold its seventeenth annual meeting at Washington, D. C., Monday, Tuesday, Wednesday and Thursday, November 12-15, 1923. Dr. W. S. Leathers, Executive Officer, Mississippi State Board of Health, Jackson, is President.

This meeting will be made up of twenty sections and conjoint meetings—the programs of these meetings will cover every phase of scientific medicine and surgery. (See marked bulletin for names of sections and conjoint meetings.)

The President of the United States will receive informally the members of the Southern Medical Association and their wives, Thursday, November 15th, at 12:30 p. m., at the White House. Of special interest to the ladies will be the reception at the Washington Club on Tuesday afternoon where Mrs. Woodrow Wilson will be the guest of honor. The usual reception to the President of the Southern Medical Association will be held on Tuesday night at the New National Museum, one of the most beautiful public buildings of Washington, a detachment of the Marine Band furnishing the music. Other special entertainments being received.

At the first general session on Monday night, in addition to the address of the President, Dr. Leathers, there will be an address by Dr. Geo. E. Vincent, President of the Rockefeller Foundation, New York, N. Y.; Oration on Public Health by Dr. W. S. Rankin, State Health Officer of North Carolina; Oration on Medicine by Dr. Stewart R. Roberts, Atlanta, Georgia; and Oration on Surgery by Dr. J. W. Barksdale, Jackson, Miss.

A joint dinner by the Section on Surgery and the Section on Radiology, as well as a number of section dinners, will be interesting features of Tuesday evening. The Alumni Reunions, which promise to be an outstanding feature of this meeting, will be held on Wednesday night and it is expected that there will be large groups present from all of the leading medical schools.

Physicians who golf are urged to bring their clubs. There will be a golf tournament at which the usual prizes will be offered. Play will be over the championship course of the Columbia Country Club.

The University of Virginia Hospital, Charlottesville, have already announced special clin-

ics for Friday and Saturday following the meeting. While no definite announcement has been made yet, it is anticipated that Johns Hopkins and the University of Maryland will arrange clinic programs for Friday and Saturday following the Washington sessions.

Washington has many splendid hotels and everyone is assured of comfortable accommodations this year. Special reduced rates have been granded by railroads on the certificate plan. Each member of the Southern Medical Association will receive a certificate without application for it. Any physician who is a member of his state and county medical society, although not a member of the Southern Medical Association, who desires to attend this meeting, can have a benefit of these reduced rates by requesting a certificate from the Association office. In another column reference is made to the plans of the Florida delegation.

In another column reference is made to the Florida delegation.

RESULTS OF CANCER RESEARCH.

The twenty-first annual report [4] of the Imperial Cancer Research Fund, just issued, summarizes the results of the work of the organization and indicates the present line of attack on the cancer problem. Vitamin deficiency, even when severe enough to be incompatible with life, has apparently no inhibitory effect on the growth of cancer. A deficiency of the water soluble and fat soluble vitamins, developed under the most stringent conditions, produced no effect as to cancer, but experiments were not performed with the antiscorbutic vitamin C. This was considered too dangerous to permit of application to the treatment of cancer in man. The curious fact is also reported that absence of vitamins from the diet produces atrophic lesions similar to those produced by exposure to roentgen ray and radium radiation. Exposure to radium has a profound effect on intestinal activities, and large doses may lead to severe intestinal lesions. There is also an effect on the blood platelets which, if allowed to continue, is associated with an incurable anemia of the pernicious type. The obesity that sometimes follows small doses of irradiation is related to testicular atrophy and hypertrophy of the interstitial cells.

In tissue cultures, the differentiation and loss of differentiation have been reduced to an orderly sequence and can now be reproduced at will. It has been shown that differentiation is absent in cultures of normal kidney and skin when the parenchyma cells are grown in pure culture without the admixture of connective tissue. The addition of a pure culture of connective tissue, however, is quickly followed by typical histologic differentiation, the kidney producing convoluted tubules with bulblike extremities, and the squamous epithelium keratinizing into cell nests. It is virtually impossible, under experimental conditions, to maintain an exact balance between the two tissues in culture; but the sequence of forms presented by squamous epithelium leaves no doubt that in this lies the explanation of the ordinary range of cell forms known in human pathology and in the tar carcinoma of animals. When cultures of undifferentiated mammary carcinoma of the mouse grew in the presence of an abundance of active connective tissue, the large alveolar masses of polygonal cells became broken up into small trabeculæ in which a small lumen appeared, and there resulted a loose adenomatous structure that closely resembled developing mamma. When the connective tissue was removed from the culture, the undifferentiated conditions returned. Drew concluded, therefore, that the loss of differentiation is merely a superficial peculiarity of cancer cells. Even when exhibited in the most superlative degree, the loss of differentiation may be replaced by wonderfully perfect differentiation without in any way affecting the essential malignancy of the cells.

Other experiments may possibly lead to some insight into the essential nature of malignant transformation. It is known that tumors and embryonic tissue grow without delay in a suitable medium, but that adult tissues began to proliferate only after a considerable lapse of time. The delay with adult kidney tissue, for example, may be fourteen days. But if an extract of adult minced kidney which has been incubated along with the fluid used for extraction is added to the culture medium, growth begins at once in every case. If the extract is made with ice-cold saline solution without incubation, the delay is as long as it is in cultures made without it at all. Now, if a similar ice-cold extract is made from a rapidly growing transplantable tumor, growth starts as promptly as when the incubated extract of minced kidney is used. It may be, it is said, that malig-

4. Imperial Cancer Research Fund, Twenty-five Annual Report, 1922-1923, July, 1923, under the direction of the Royal College of Physicians of London and the Royal College of Surgeons of England.

nant cells produce automatically and continuosly growth-activating substances that normal tissues elaborate only in response to injury. The mode of production of these activating substances, Murray believes, is an essential part of the difference between normal and cancerous cells. This conception helps to explain at least the role of irritation in cancrogenesis. It may be imagined, he says, that the specific irritants that are known to lead to the development of cancer set up a slight degree of protoplasmic disintegration which is still compatible with the life of the cell. That sudden change, which, after a long period of irritation, marks the beginning of cancer would then correspond to a change in the protoplasm by which the production of the advancing substance turns from its purely reactive character to a self-acting process, the result of a sort of education of the cells. Deelman has shown that this preparatory stage can be shortened by combining trauma with the application of the specific irritant.

These experiments will be set forth in detail in a forthcoming scientific report, in which Russell's work in obtaining tar sarcomas in rats will also be published.—*Jour. A. M. A.*

FLORIDA DELEGATION TO ATTEND SOUTHERN MEDICAL ASSOCIATION MEETING.

Plans have been perfected for the comfort of Florida's delegation to the meeting of the Southern Medical Association which convenes in Washington November 12th and remains in session through the 15th. Special cars have been provided for the convenience of the Florida delegation and will be attached to the regular train of the Seaboard Railway, leaving Jacksonville on Sunday morning, November the eleventh, at 8:55. The train is due to arrive in Washington at 8:45 the following morning.

The railroads have made an attractive excursion rate of forty-two dollars and fifty-two cents ($42.52) from Jacksonville to Washington and return with corresponding reduced rates from other points in the State. All members of the profession who have not already done so should make their reservations by communicating with the city ticket agent of the Seaboard Railway, Hill Building, Jacksonville, Fla.

COUNTY SOCIETY NEWS.

PINELLAS.

The members of the staff of the city hospitals have organized an outpatient clinic for the Mercy (negro) Hospital of St. Petersburg, to begin October 1st. A physician and a surgeon will be on duty daily. All patients must report not later than 8 a. m., and a fee of $1 will be charged those who can afford to pay. All money collected in this manner will go into a fund for the purchase of additional hospital equipment, etc. The Mercy hospital has just been completed and occupied and is thoroughly modern.

Work is progressing rapidly on the $75,000 addition to the Mound Park (city, white), Hospital.

Dr. Smith of Quitman, Georgia, has recently located in St. Petersburg. His practice is limited to ear, eye, nose and throat work.

DUVAL.

At the October meeting of the Society, Dr. J. L. Kirby-Smith presented a clinical case of severe, widespread, hemorrhagic Herpes Zoster which marked constitutional symptoms.

Mr. Harry W. Reinstine, assistant district attorney, spoke interestingly on "The Legal Phase of Narcotic Control."

We regret to report the closing of the Marvin Smith Hospital.

Confronted by a serious shortage of hospital beds in Jacksonville, we are vitally concerned in the campaign for funds for the enlarging of St. Luke's Hospital and for the efficient maintenance of the plant. The hope of the Hospital Association, as expressed by the director, Dr. Ralph N. Greene, at a dinner served to nearly a hundred of the physicians of Jacksonville in the hospital dining room on the 16th of October, is that sufficient funds may become available for the establishment of a children's department, an obstetrical pavilion, and a neuro-osychiatric department.

ORANGE.

Dr. Sylvan McElroy spent the month of September at Daytona Beach. He and Dr. J. S. McEwan challenge the world in competition in sea bass fishing.

Dr. Mitchell spent the month of September at the Post-Graduate Hospital, New York City.

At the last medical meeting Dr. Coffin presented an interesting paper on "Sleep," which, however, failed in its purpose as it provoked active discussion.

Dr. Selman presented a paper on "Vertigo," and Dr. Edwards gave one on "Glycosuria in Pregnancy."

POLK.

Dr. W. E. Sherman, of Winter Haven, attended clinics of Dr. Seale Harris in Birmingham and Dr. Banking of Toronto on insulin therapy.

The Florida Midland Medical Society held meeting at Bartow on Wednesday, October 24th. They were entertained by the Bartow Chamber of Commerce. About fifty visiting doctors were guests of Bartow for the day.

Following scientific program the following officers were elected for ensuing year. President, Dr. W. R. Groover, Lakeland; Vice-President, Polk County, H. K. Murphy, Mulberry; DeSoto County, H. P. Bevis, Arcadia; Pinellas County, A. J. Wood, St. Petersburg; Hillsborough County, J. W. Alsabrook, Plant City.

Dr. Thos. D. Vasser, a member of the State Board of Medical Examiners, and formerly of Brandon, Florida, has located at Kathleen.

Dr. Lyman G. Haskell, formerly of Auburndale, has moved to Mandarin and entered into active practice there.

Dr. H. E. McMurray, formerly of Pierce, is in New York, doing post-graduate work in diseases of children.

INTERCHANGE OF HEALTH OFFICERS IN THE UNITED STATES.

An event which may be fraught with far-reaching consequences for world health is the Third General Interchange of Health Officers arranged by the Health Section of the League of Nations which is now taking place in the United States.

Representatives from France, England, Italy, Russia, Poland, Spain, Holland, Belgium, Greece, Jugoslavia, Germany, Switzerland, Norway, Mexico, San Salvador, Brazil, Chile, and Canada, delegated by their respective governments to participate in a course of study and observation, arrived in America the first week in September and will remain for approximately three months. Until September 22nd the delegates will remain in Washington, studying national health organization as administered by the United States Public Health Service. Following the close of the course of study of the national health agency the delegation of visitors will separate into three groups, one of which will proceed to Virginia, another to North Carolina and a third to Alabama, where about three weeks will be spent in studying state and local health departments. Richmond, Virginia, Raleigh, North Carolina, and Montgomery, Alabama, are the Southern cities which have been selected for study. From there the groups will proceed to Massachusetts, New York and Pennsylvania, respectively, for the purpose of studying the health administration in three Northern States and small cities. Syracuse, New York, Allentown, Pennsylvania, and one of the smallest cities of Massachusetts yet to be designated, will be visited for a short period. Following this the groups will make a study of health administration in three of the large cities of the East, namely, Boston, New York and Philadelphia. Present plans call for a reassembling of the entire delegation in Washington late in November for a final conference.

The present group numbers among its members many of the most eminent sanitarians of the world. France is represented by Dr. L. Aublant, Inspector principal des Services d'hygiene, Dep. de l'Herault, and Dr. F. Bussiere, Director des Services d'hygiene de Montlucon. England is represented by Dr. Thos. Carnwath, D. S. O. M. D., Ministry of Health, London S. W. 1., and Dr. Chas. Porter, M. D. M. O. H., St. Marylebone, London. Italy is represented by Dr. F. Piccinni, Ufficio sanitario de Porto, Napoli. Russie is represented by Dr. S. Slonewski, San Epid. Bureau, (2 Malyj-Tcherkassky Perenlok), Narkowzdraw, Moscou; Dr. A. Marzeew, Chief de San. Epid., (Lechnologiczskaja Ulica), Narkowzdraw, Kharkof, Ukraine, and M. Voeykoff, Sanitary Engineer, Narkowzdraw, Moscou. Spain is represented by Dr. R. Fernandez Cid, Inspector provincial de la Sante publique, San Sebastin. Holland is represented by Dr. D. J. Hulshoff Pol, Inspecteur gouvernmental de la Sante Publique, La Haye. Belgium is represented by Dr. van Boeckel, Director du Laboratoire de l'admanistration de l'Hygiene, Broxelles, and Dr. Ensch, Chef de Service d'Hygiene, Schaerbeck, Bruxelles. Greece is represented by Dr.

Pigos, Director, State Bacteriological Laboratory, Athens, (a. b. s. Greek Legation, Paris). Poland is represented by Dr. J. Batko, Provincial Health Office, (Wojewodski Uv ead Zdrowra), Cracow. Jugoslavia is represented by Dr. Ivo Kuhn, Referent du Ministere de la Sante publique, Belgrade. Germany is represented by Dr. K. Sannemann, Port Medical Officer, Hamburg. Switzerland is represented by Dr. J. Hunziker, Chef du Service d'Hygiene du Canton de Bale-Ville. Norway is represented by Dr. E. Anderson, Medicin de Prefecture, Lillehammer, Norvege. Mexico is represented by Dr. Enrique Orvananos, Government Inspector of Hygiene, Mexico City. San Salvador is represented by Dr. J. Segovea, Director Sanidad San de Salvador. Brazil is represented by Dr. Vasconcellas. Chile is represented by Dr. J. Ducci, of the Faculty of Medicine, Santiago de Chile, and Dr. C. Mayers, Director, League of Social Hygiene, Santiago. Canada is represented by Dr. M. M. Seymour, Med. Deputy Minister of Public Health, and Director of Venereal Disease Control, Saskatchewan.

The delegation is accompanied by Dr. Norman V. Lothian, of the Health Section of the League of Nations. Surgeon-General Hugh S. Cumming, of the United States Public Health Service, delivered the address of welcome to the delegates.

UNDER-NOURISHMENT IN YOUNG CHILDREN

Astounding percentages of under-nourishment and physical defects are found in a group of 6,015 young children of Gary, Ind., studied by the U. S. Department of Labor through the Children's Bureau.

The Gary study is the first investigation by the Bureau of the "neglected age of childhood"—between babyhood and school.

Two reports have been written on the results of this study. The first, called "Physical Status of Pre-School Children," was issued last year. The second, called "Children of Pre-School Age in Gary, Ind.," and dealing with general child welfare conditions, especially nutrition, is now in press.

Results of the second study, recently made public, show the poverty of diet among nearly all the children.

The diets of 6,015 children, all from two to seven years, were classified into five groups, A, B, C, D, and E, according to their adequacy and suitability for children of these years.

Of the "A" diet the report says:

"The 'A' diet is not one difficult of attainment. It is merely any diet capable of meeting the body's needs and administered with some consideration for the child's age and development. Moreover, such a diet need not be an expensive one—milk, whole cereal, and fruit or vegetable daily being sufficient to allow a diet to qualify in this group—and it is the easiest possible kind of diet to prepare. This being the case it might be expected that the large majority of the children would fall into the 'A' diet group.

"These facts notwithstanding, only 25 of the 6,015 children—less than half of 1 per cent of the total number—were thus fortunate. Furthermore, the number classed as having 'B' diets (probably adequate in food requirements though unsuitable in character and including but a pint of milk) was likewise small, amounting to 8.5 per cent of the whole group. Less than 10 per cent of the children studied, in other words, were receiving diets which appeared adequate to their needs. Almost three times this number (29.2 per cent) had diets (C) whose adequacy was highly questionable; and nearly two-thirds of the entire group (60.5 per cent) were found to have diets plainly incapable of covering all their bodily requirements, 58.4 per cent being in the D group and 2.1 per cent (5 times the percentage of A's) in the extremely inadequate E group.

The report analyzes in detail the use of certain staple foods among the children, for instance:

Only 18.9 per cent of all the children were getting a pint of milk a day and 57.2 per cent had no milk at all to drink. Two-thirds of the entire group were found to drink coffee habitually and 40 per cent to have it more than once a day.

"Milk is not the only desirable food which was little used," the report states, "since vegetables, fruits, cereals, and eggs were likewise conspicuously lacking.

"The extreme poverty of the diets is further shown by the fact that nearly half (45.5 per cent) of them lacked as many as four of the foods usually included in a child's diet."

Slightly over half the children studied were given physical examinations. 64.7 per cent were found to have decayed teeth. 14.9 per cent had bone defects which are the result of a deficiency diet. Only 4.8 per cent had no defects at all. Over a third had more than five distinct physical de-

fects. Children with adequate diets (classed as A and B) made a better showing than the rest of the group. Over four times as high a percentage of these children were free from defects as of the children receiving deficient diets (classed as D and E).

The report also analyzes other conditions affecting children of this age, including community conditions, home and family conditions, housing, economic conditions, child care and hygiene, and dental care.

UNITED STATES CIVIL-SERVICE EXAMINATION.

The United States Civil Service Commission announces the following open competitive examination:

JUNIOR MEDICAL OFFICER.

Applications will be received until December 28th. The examination is to fill vacancies in the Indian Service, at entrance salaries ranging from $1,000 to $1,200 a year, plus the increase of $20 a month granted by Congress, and quarters, heat, and light; in the Coast and Geodetic Survey, at an entrance salary of $1,020 a year, plus the increase of $20 a month, and an allowance of $1 a day for subsistence while serving on board ship, except in the Philippines, where the allowance is $2.50 a day; and, in the Panama Canal Service, at an entrance salary of $250 a month.

Applicants must have been graduated from a medical school of recognized standing; or be senior students in such institution and furnish proof of graduation within six months from the date of making oath to the application.

Competitors will not be required to report for examination, but will be rated on their education, training, and experience.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of United States civil-service examiners at the post office or customhouse in any city.

CARBON MONOXIDE AND TOBACCO.

The much-mooted question as to whether the carbon monoxide present in tobacco smoke constitutes a hazard to the smoker in confined indoor spaces seems to have been settled as a result of tests just completed by the Department of the Interior at the experiment station of the Bureau of Mines at Pittsburgh, which demonstrated the danger to be negligible.

The tests, which were performed in the course of general studies of the Bureau of Mines relative to gas hazards in mines, were made on three men confined in a closed chamber whose dimensions were 1,000 cubic feet. The three subjects puffed merrily for the space of an hour and a half at cigarettes of every variety, Turkish, Egyptian, the old Virginia brand, and the type wherein the smoker "rolls his own." Following this, the smokers drew energetically at an infinite variety of cigars—cheroots, Pittsburgh stogies, black Manilas and Havanas of choice degree. Finally they puffed frantically at pipes, at pipes of clay and cob, at pipes of meerschaum and briar. At the conclusion of the performance the air of the closed chamber had become so smoky that it was impossible to see across the room. The atmosphere was so irritating to the eyes that it was necessary to wear goggles.

Samples of the atmosphere and blood samples of the smokers were then taken for analysis. It was found that in no instance did the carbon monoxide content of air exceed 1/100 per cent. The maximum blood saturation was 5 per cent. Some of the subjects supposedly inhaled their smoke, but the tests indicated that such inhalation, though it may have extended to the bronchial tubes, did not penetrate throughout the lungs. The tests indicate that carbon monoxide hazard from smoking indoors or in mines is negligible in itself, though the Bureau of Mines investigators consider that it may add to the smoker's hazard should he be caught by carbon monoxide from sources such as occur in the mining industry.

COD LIVER OIL IN TUBERCULOSIS. — Experiments carried out in the Hygienic Laboratory of the U. S. Public Health Service to determine the effect of cod liver oil on the tuberculosis of the guinea pig failed to show any definitely beneficial effects. There was no evidence of the deposition of calcium when this element was administered along with the cod liver oil. These results warn against unwarranted optimism and justify critical investigation whenever calcium or cod liver oil are lauded as a specific in tuberculosis. (*Jour. A. M. A.*, June 16, 1923, page 1778.)